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Individual differences in restrained eaters

by

Kelly Moore

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Business and Technology (Specialization - Marketing)

Program of Study Committee:
Russell Lacznia, Co-Major Professor
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Ames, Iowa

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ABSTRACT

This research examines three major research questions: 1) the role of impulsivity and emotional intelligence in restrained eaters' behaviors, 2) if menu calorie labeling will be utilized by restrained eaters to make healthier eating decisions, and 3) if mindful eating can effectively alter a restrained eater's behavior.

Specifically study one examines the role of impulsivity and emotional intelligence in restrained eaters' behavior. Previous research has found restrained eaters to have less healthy eating behaviors than unrestrained eaters. Emotional intelligence has been shown to result in healthier eating behaviors, whereas impulsivity negatively impacts eating behavior.

Results show impulsivity does not moderate the relationship between restraint and unhealthy eating behaviors in this data. More restraint was associated with higher BMI. Restrained eaters are characterized as having episodes of disinhibited eating, which result in weight gain despite constant dieting. Increased emotional intelligence was associated with higher BMI and a higher number of calories selected. Further, increased impulsivity was associated with a higher number of calories selected as well.

Results also indicate that the three commonly used measures of restraint yielded similar results when used separately in the model, indicating they measure the same construct. The Herman and Polivy (1980) restraint scale showed two interaction effects that the Eating Inventory (formerly Three Factor Eating Questionnaire) and the Dutch Eating Behavior Questionnaire did not.

Study two investigates whether new Affordable Care Act legislation requiring restaurants to provide menu calorie labeling will be effective in reducing the number of calories restrained eaters consume. This legislation has spurred numerous studies on this topic recently. Study two is unique, however, because it uses an eye tracking methodology to investigate this relationship. In this research, restrained eaters were found to dwell on menu calorie information significantly longer than unrestrained eaters.

Finally, study three explores a mindful eating intervention as a method by which to train restrained eaters to make healthier decisions. Recent psychology literature has found mindfulness to be an effective treatment method for numerous disorders, including eating disorders. Results from food diaries completed by participants show restrained eaters report consuming significantly fewer calories than unrestrained eaters.

CHAPTER 1

OVERVIEW

Introduction

According to the U.S. Center for Disease Control and Prevention, almost two-thirds of Americans are overweight or heavier. Obesity is a dangerous condition that affects over one-third of adult Americans (78 million people) (Chan, 2012) and approximately 17% of children (ages 2-19) (Ogden, Carroll, Kit, and Flegal, 2012).

The costs of obesity are high. Obesity increases an individual's risk for serious health problems, including type 2 diabetes, heart disease, stroke, and some types of cancer (Wickens, 2005). Moreover, average annual medical costs for obese individuals were \$1,429 higher in 2008 than for normal weight individuals (Chan, 2012; Finkelstein, Trogon, Cohen, and Dietz, 2009).

Obesity rates doubled for adults and tripled for children during the period of 1980-2008, despite legislation and numerous programs to reverse this alarming trend. Recently, as part of the Affordable Care Act of 2010, Congress passed a provision that required restaurants that are part of a chain with 20 or more locations to provide calorie and other nutrition information for standard menu items. One of the purposes of this study is to examine whether the presence of caloric information will change individual's eating behavior.

Individuals frequently attempt to combat obesity by dieting, or trying to control what they eat. We call people who are chronic dieters "restrained eaters," discussed in detail in the next section.

Restrained Eating

Herman and Polivy (1980) characterized restraint as the cognitively mediated effort to combat the urge to eat. “Restrained eating is a pattern of chronic dietary restriction interspersed with episodes of disinhibited overeating” (Blechert, Feige, Hajcak, and Tuschen-Caffier, 2009, p. 262). In further explanation, Scott et al. (2008, p. 392) claimed restrained eaters have “an emotional response to foods that may cause them to react in a more impulsive manner than unrestrained eaters.” Restrained eaters try to restrict their food intake (Nederkoorn and Jansen, 2002). Laessle, Tuschl, Kotthaus, and Prike (1989, p. 504) define dietary restraint as “the intention to diet to achieve or maintain a desire weight.”

Eating research in the field of psychology has formed two distinct schools of thought. One line of research has characterized eating as mainly physiological, whereas the other line of research has focused on non-physiological factors (Herman and Polivy, 1983). The prior line of research (physiological) assumes eating is a biological activity. An individual eats when they are hungry and stops eating when they are full. These events are controlled by signals from the brain. The latter line of research (non-physiological) assumes eating is controlled by other factors, such as social influences and cognitive considerations. This research claims these other factors have no evident biological purpose (Herman and Polivy, 1983).

Boundary Model

The boundary model was posited by Herman and Polivy (1983) with the goal of incorporating both lines of research. The amount of food consumption is illustrated on a

continuum; with hunger at the far left end representing a deficit of food consumption and satiety at the far right end representing excess food consumption (see Figure 1). These represent the ‘biological boundaries’ that help signal when the person feels hungry or satiated (Nederkoorn and Jansen, 2002). Thus, the food consumption falling between these boundaries are thought to be under control of other cognitive (non-physiological) factors. Additionally, a diet boundary is self-imposed by restrained eaters. This is the maximum desired food consumption for the restrained eater in question. If the restrained eater does not perceive that they have exceeded the diet boundary, they have successfully restricted their consumption. On the other hand, if the restrained eater perceives they have exceeded the diet boundary, the restrained eater feels they are justified in overeating (Nederkoorn and Jansen, 2002).

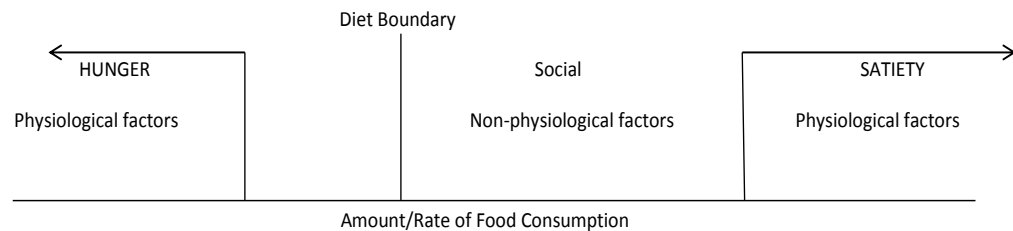


Figure 1. Boundary Model from Herman & Polivy, 1983

The “pre-load” paradigm has frequently been used to study restrained and unrestrained eaters. In this method, participants are forced to consume a high calorie pre-load followed by a “taste test.” The participant is led to believe the experimenters are interested in their tasting preference, but in actuality they are interested in the amount of food the person eats during the taste test. Research has shown unrestrained eaters consume less food during the taste test following a pre-load; whereas restrained eaters consume more food during the taste test following a pre-load than without a pre-load

(Blechert et al., 2009; Herman and Mack, 1975; Nederkoorn and Jansen, 2002).

Nederkoorn and Jansen (2002) refer to this phenomenon as counterregulation.

Counterregulation assumes that unrestrained eaters stop eating when they are full. Therefore, eating a high caloric pre-load satisfies their hunger more, requiring them to eat less in the subsequent taste test. On the other hand, restrained eaters follow what has been called an “all or nothing” dietary rule (Blechert et al., 2009) or the “what-the-hell effect” (Herman and Polivy, 1983). This argument assumes after restrained eaters eat a high caloric pre-load, the individual perceives they can no longer maintain their diet goal, resulting in overeating.

Herman and Polivy (1983) describe the “what-the-hell effect” as the following. When a restrained eater eats a high caloric preload, such as a milkshake, they perceive they are ‘to the right of the diet boundary’ (shown in the boundary model above). Therefore, they feel there is no point in trying to continue to restrain their consumption because their goal of maintaining a diet boundary has been undercut by the preload. Thus the dieter eats until the point of satiety. Unfortunately, for restrained eaters, the point of satiety is farther ‘to the right’ of the continuum than it is for unrestrained eaters. Hence, they restrained eater may have episodes of disinhibited eating.

Cue Reactivity Theory

One shortcoming of the boundary model is that it doesn’t account for why restrained eaters don’t regulate their behavior similarly when they haven’t actually eaten the food. Nederkoorn and Jansen (2002, p. 62) explain “this theory states that when a person regularly has eating binges, and these binges are reliably preceded by certain cues,

these cues become predictors of the start of a binge. Exposure to these cues induces conditioned physiological activity, which can prepare the person for the intake of food.” In other words, exposure to a preload stimulates physiological responses and cravings in the restrained eater, which in turn lead to increased food intake and counterregulation (Nederkoorn and Jansen, 2002).

Personal Characteristics

Psychology researchers hypothesize that the presence of the impulsivity trait in restrained eaters increases their susceptibility to unhealthy eating behaviors. Several researchers have found the general trait of impulsivity is related to overeating and weight gain (Guerrieri, Nederkoorn, and Jansen, 2008; Jansen et al., 2009).

In addition to impulsivity, several personality traits have been found to be more prominent in restrained eaters, such as neuroticism, stress, anxiety, and narcissism (Polivy, 1996; see Chapter 2).

Situational Characteristics

Wansink (2004) offers four consumption drivers in the individual’s eating environment, and five food-related environmental factors that influence consumption. The consumption drivers include 1) eating atmospherics, 2) eating effort, 3) eating with others, and 4) eating distractions. The five food-related environmental factors that influence consumption volume but are unrelated to palatability are termed the “Five S’s of the food environment.” These factors include salience, structure, size, whether it is stockpiled, and how it is served.

Purposes

One research aim is to determine what characteristics in restrained eaters lead to unhealthy eating behaviors, in order to educate them on how to avoid unhealthy behaviors and engage in healthy eating decisions. Establishing what personal and environmental factors lead restrained eaters' to unhealthy eating behaviors is central to this endeavor. Is it the context, the person, or both that drive these decisions? Further, do restrained eaters who are high in the impulsivity trait behave worse than those low in impulsivity?

I am also interested in exploring the role of emotional intelligence (EI) in the restrained eater's decision. Research has indicated an individual's emotions play a role in their unhealthy eating decisions (Tice, Bratslavsky, and Baumeister, 2001). Additionally, Kidwell, Hardesty, and Childers (2008a) found emotional intelligence predicted healthy food choices.

In summary, this research attempts to clarify what personal and situational characteristics affect a restrained eater's behavior. I will specifically examine whether personal characteristics such as emotional intelligence and impulsivity level of the restrained eater will modify their eating behavior. Furthermore, I will explore whether the presence of the newly-required menu calorie labeling, a situational characteristic, will lead restrained eaters to behave differently, and if an emphasis on mindful eating can influence their behavior.

Consumer Emotional Intelligence

Mayer, Salovey, and Caruso (2000) recognized two models of emotional intelligence, 1) ability models and 2) mixed models. They focused on ability models because they thought mixed models lacked internal consistency (Kidwell et al., 2008a). The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) scale was developed as an emotional intelligence measure to examine the relationship between general emotional intelligence and performance (Mayer, Salovey, Caruso, and Sitarenios, 2003).

Kidwell, Hardesty, and Childers (2008a) adapted the MSCEIT scale to be domain-specific to consumer behavior. They sought to investigate if more effective consumers were driven by specific competencies. Hence, Kidwell and associates (2008a) established the Consumer Emotional Intelligence Scale (CEIS). The four dimensions are perceiving emotion, facilitating emotion, understanding emotion, and managing emotion (Mayer and Salovey, 1997).

Mindful Eating

Recently researchers have begun examining intervention techniques that may help restrained eaters better control their diet. A relatively new method, known as “mindful eating,” has been defined as describing a non-judgmental awareness of physical and emotional sensations associated with eating (Framson et al., 2009). Mathieu (2009) reports mindful eating involves several activities, including: 1) slowing down the pace of eating, 2) eating away from distractions, 3) becoming aware of the body’s hunger and fullness cues, 4) acknowledging responses to food without judgment, 5) choosing to eat food that is both pleasing and nourishing by using all of the senses while eating, 6) being

aware of and reflecting on the effects caused by unmindful eating, and 7) meditation practice as a part of life. Potentially, experts believe mindful eating can be very beneficial by facilitating a regained sense of hunger and fullness, weight loss and weight maintenance, increased self-esteem, and a sense of empowerment with regard to eating (Mathieu, 2009).

However, Mathieu (2009) claims there are a few obstacles for individuals attempting to engage in mindful eating. First, the way of life in the US is to put a premium on productivity, encouraging individuals to eat convenient food quickly with lots of distractions. Second, some people have difficulty perceiving their hunger and fullness cues due to either prior eating disorders or a genetic predisposition.

Savoring and Desire

Savoring is an important component in the concept of mindful eating. Individuals may differ in their capacity to savor their food, resulting in overeating in those who are less able to savor. When an individual is forced to direct attention towards the eating process, they are more likely to savor their food since they are thinking about it.

Bryant, Chadwick, and Kluwe (2011, p. 108) define savoring as involving “the self-regulation of positive feelings, most typically generating, maintaining, or enhancing positive affect by attending to positive experiences from the past, present or future.” In other words, savoring is the ability to generate, intensify and prolong enjoyment of an event through one’s own volition (Bryant, 2003). People’s perceptions of their ability to enjoy positive experiences are termed *savoring beliefs* (Bryant et al., 2011).

Bryant (2003) developed the Savoring Beliefs Inventory (SBI). There are three dimensions of the self-report instrument, including savoring in the moment (present), savoring through reminiscence (past), and savoring through anticipation (future). People typically report being most capable of savoring through reminiscence, moderately capable of savoring in the present, and least capable of savoring through anticipation (Bryant et al., 2011).

Self-regulation involves an attempt to reduce the discrepancy between a current state and a desired goal state (Alberts, Mulken, Smeets, and Thewissen, 2010). Traditionally self-regulation research has focused on people's ability to control themselves, but recently scientists have realized desire is also an important factor (Hofmann and Van Dillen, 2012). Desire is the feeling of wanting something that motivates behavior (Hofmann and Van Dillen, 2012).

Hofmann and Van Dillen (2012, p. 317) define desire as "an affectively charged motivation toward a certain object, person, or activity that is associated with pleasure or relief from displeasure." Hofmann and Van Dillen (2012) developed a dynamical model of desire, in which desire originates from the interplay of stimulus properties, internal need states and learning history. An individual processes the reward value automatically, and then the desire can proceed to "mindless" behavior or can emerge into consciousness. Once the desire has emerged into consciousness, it occupies working-memory resources. Hofmann and Van Dillen (2012) cite recent research that suggests methods for which one can prevent the development of desires by having an impact on the early affective processing of the stimuli. These studies suggest construal of the desire, adopting an

abstract mind-set, and implementation intentions to avoid temptation have all been shown to have an impact on this early processing (Hofmann and Van Dillen, 2012).

Research Study

Hypotheses

I expect restrained eaters who are high on the impulsivity trait will engage in less healthy eating behaviors than restrained eaters who have less impulsivity or unrestrained eaters. I also hypothesize individuals with high emotional intelligence will make healthier eating decisions than individuals with lower emotional intelligence. Additionally, I hypothesize individuals with low impulsivity and high EI will make healthier decisions than low EI, highly impulsive individuals.

Moreover, I expect the presence of caloric information on a menu to influence restrained eaters to make healthier decisions than their unrestrained counterparts. Since restrained eaters are chronically dieting and hypersensitive to external food cues, I argue restrained eaters they will examine calorie information longer than unrestrained eaters. Finally, I hypothesize a mindfulness intervention will influence restrained eaters to make healthier (more mindful) eating decisions.

Procedure

The first study will provide an overview of the personal and situational factors impacting restrained eating to explore if certain factors are more important in predicting

restrained eaters behavior. I anticipate impulsivity of the individual will be important in determining their eating behavior.

The second study will use an eye tracker as a tool to gauge whether the presence of caloric information on a menu display influences restrained eaters to make healthier decisions. In this study, I will present the participant with a menu board on a computer screen. The menu board will contain the name of the food item, the price of the food item, and a column for caloric content. The participant will examine this contextual factor with instructions to select the food items they would want to eat in a 24-hour time period. The eye tracker will be used to determine where the participant looks the longest and most frequently.

In the third study, an expert will teach participants in the experimental condition important techniques associated with mindful eating. Participants in both conditions will then be asked to complete a food diary for a few weeks following the training (or lack thereof). Results will indicate which participants lost more weight over the course of the experiment and which participants made healthier food decisions (judging by their food diary).

Summary

Obesity is an alarming trend that is becoming more and more prevalent in the US. Many consumers are aware of this, and try to restrict their food intake. Restrained eaters are chronic dieters. Two schools of thought exist concerning eating behaviors, biological and non-physiological. The researchers on the biological side believe the brain sends signals when an individual is full, causing them to stop eating. Non-physiological

researchers believe social and cognitive factors are most important. In an effort to incorporate both worlds, Herman and Polivy (1983) developed the boundary model, which posits a restrained eater sets an arbitrary ‘diet boundary.’

Numerous personal and situational characteristics affect the behavior of restrained eaters. Additionally, an individual with higher emotional intelligence is expected to be better equipped to make healthy eating decisions, while more impulsive individuals are less equipped.

One technique that may be beneficial in helping restrained eaters make more healthy eating decisions is mindful eating. Still there are obstacles to this approach, including an emphasis on productivity in the American way of life and difficulty for some individuals to perceive fullness cues. Further, individuals also differ in their capacity to savor.

This dissertation will consist of three studies. The first study will be an online survey to determine the role of personal factors such as emotional intelligence and impulsivity on restrained eaters’ decisions. The second study will attempt to gauge the effectiveness of calorie labeling on menus through an eye-tracking approach. Finally, the last study will try to determine if a mindfulness intervention will help restrained eaters make a healthier eating decision, defined as food selections lower in calories.

CHAPTER 2

LITERATURE REVIEW

Restraint Theory

Restraint theory has its foundations in Schachter's (1968, 1971) and Nisbett's (1972) theories of obesity (Ruderman, 1986). Schachter (1968, 1971) proposed that obese individuals were more responsive to compelling environmental cues than were their normal weight counterparts (Ruderman, 1986). Numerous studies examining this theory have yielded inconsistent findings (see Wooley and Wooley, 1975, and Leon and Roth, 1977, for literature reviews). Ruderman (1986) posits this is due to many measurement problems, including definitions of external responsiveness in nonfood cue studies (typically the amount eaten), distinguishing between internal and external cues, how to vary the intensity of external cues, and sampling issues.

Still, researchers have drawn two conclusions. First, obese and normal weight people clearly have different eating patterns (Ruderman, 1986). Palatability is the only variable that has consistently produced differences, defined by Rogers (1990, p. 167) as the "hedonic aspects of the taste of food." Obese people's eating behavior is more affected by their perceptions of palatability than their normal weight counterparts (Ruderman, 1986). Still, the support offered by palatability is arguable because palatability has not been clearly defined. Originally palatability was conceptualized as an external cue, but has increasingly been defined as both an internal and external cue (Ruderman, 1986). Palatability is now thought to be influenced by individual differences as well as by properties of the food (Ruderman, 1986).

The second conclusion is that Schachter's original theory, that obese people's behavior is mostly influenced by external cues and normal weight people are primarily influenced by internal cues, is "too simplistic" (Ruderman, 1986, p. 248).

Building on Schachter's theory, Nisbett (1972) proposed an explanation of why obese and normal weight people differ in their external responsiveness to food cues. He proposed each person has an ideal weight (called a "set point"), and obese people have higher than average set points (Nisbett, 1972). Set point is determined by the number of fat cells in a person's body. Ruderman (1986) argues set point is too difficult to test and parts of the theory aren't logical. However it is important in that it drew attention to the role of dieting in eating behaviors (Ruderman, 1986), which launched inquiry into the restraint construct by Herman, Mack, and Polivy (Herman and Mack, 1975; Herman and Polivy, 1980, 1983). These authors took away that dieting is an important factor in an individual's food regulation efforts, and therefore initiated restraint research (Ruderman, 1986).

Restraint theory holds that eating style is under cognitive control (as opposed to physiological), which leads an individual to ignore satiety cues. This often results in disinhibition and overeating in situations where cognitive resources are depleted (Johnson, Pratt, and Wardle, 2011). Polivy (1996, p. 590) described restrained eaters as "chronic on-again-off-again dieters."

Two hypotheses of restraint exist, including the "disinhibition hypothesis," and differing levels of restraint. The disinhibition hypothesis states that restrained eaters have eating patterns marked by dieting and periodic overindulgence (Herman and Polivy, 1980). Moreover, "disinhibitors" are (cognitive, emotional, or pharmacological) events

that interfere with restrained eaters' self-control (Ruderman, 1986). The second hypothesis proposes that obese people and normal weight people can be characterized by differences in level of restraint (Ruderman, 1986). Obese individuals are characterized by higher levels of restraint than normal weight individuals. This hypothesis was developed in response to Schachter's findings indicating obese individuals were more responsive to external food cues than normal weight individuals (Ruderman, 1986). Some have argued that the restraint scale is not a 'true' measure of restraint since successful dieters tend to not score as high on the scale as unsuccessful dieters on the RS (Heatherton, Herman, Polivy, King, and McGree, 1988).

Herman and Polivy (1980) developed a restraint scale (RS) to study this phenomenon. To study restrained eating, they may present the participant with a preload or no preload. As expected, unrestrained eaters pay attention to internal satiety cues when presented with a pre-load and eat less subsequently since they are not as hungry. On the other hand, restrained eaters have been found to eat more following a pre-load. This is presumably because they feel they have already broken their diet (cognitive disinhibition).

The original restraint scale (Herman and Mack, 1975) was modified (Herman and Polivy, 1980) and has been used most frequently in research. The RS has two subscales, concern for dieting (CD) and weight fluctuation (WF) (Williamson et al., 2007). Although many studies have shown the reliability and validity of the RS (Gorman and Allison, 1995), it has produced inconsistent findings which have spurred the development of two alternative scales. The two alternative scales are the Dutch Eating Behavior Questionnaire (DEBQ) (Van Strien, Frijters, Van Staveren, Defares, and Deurenberg,

1986) and the Three Factor Eating Questionnaire (TFEQ) (Stunkard and Messick, 1985) renamed the Eating Inventory in 1988 (Stunkard and Messick, 1988).

The Eating Inventory is thought to contain three subscales, 1) dietary (cognitive) restraint, 2) disinhibition, and 3) perceived hunger (Williamson et al., 2007). Heatherton and colleagues (1988) noted a few disadvantages of the Eating Inventory. First, the predictive validity has not been demonstrated. Second, it's not a uni-dimensional scale, so it doesn't identify a type of eater.

The DEBQ measures the following: 1) restrained eating, 2) emotional eating, and 3) external eating (Williamson et al., 2007). Heatherton et al. (1988) noted a few advantages of the DEBQ. It's relatively uncontaminated by weight and it's easier to fill out for the participant. Wardle (1986) noted the DEBQ was more useful than the RS because incomplete responses to the RS were frequent and very common in their sample. Heatherton et al. (1988) rebutted that was primarily true in British samples, not in the United States. Further the DEBQ was found to be generalizable across countries in this study, as their British restraint scores were similar to the Dutch sample (Wardle, 1986). Wardle (1986) found the DEBQ was not confounded with weight variability.

Heatherton and colleagues (1988) suggest the DEBQ and Eating Inventory measure different 'styles of eating,' whereas the restraint scale simply identifies dieters, without attempting to identify their eating style. In other words, the scales have different 'measurement strategies,' resulting in different findings across scales (Heatherton et al., 1988).

Williamson et al. (2007) noted, consistent with previous results, the RS-weight fluctuation scale doesn't correlate with any of the other restraint measures. This indicates

the RS measures both intent to diet and susceptibility for overeating. In a normal weight population, the RS seems to be psychometrically sound (Wardle and Beales, 1987).

Also, the median men's restraint score has been found to be significantly lower than women's scores (Wardle and Beales, 1987).

Polivy (1996) explains restrained eaters focus more on food and weight-related information. They have also been found to be more easily distractible and have a harder time concentrating on a task (Polivy, 1996). Restrained eaters have also exhibited signs of increased irritability, negative emotionality, and heightened affective responsiveness (Polivy, 1996). Further, restrained eaters have been found to score higher on neuroticism measures, such as anxiety, self-esteem, and narcissism scales (Polivy, 1996).

In conclusion, restraint theory was shaped from Schachter and Nisbett's theories of obesity. It is clear that normal and obese people have different eating patterns. Also, it seems that obese individuals are influenced more by external cues than normal weight individuals.

Situational Characteristics

Story, Kaphingst, Robinson-O'Brien, and Glanz (2008) formed a framework depicting what influences people's eating behaviors. They grouped environmental influences into three levels, including social, physical and macro-level factors. Macro-level environmental factors include things such as government policies and food marketing practices. The physical environment is the setting where people eat or procure food, such as school or child care facilities, work settings, schools or restaurants. Finally,

the social environment includes people who may impact the eating behavior, such as family, friends or peers.

As it relates to the physical environment, it has been estimated about 68% of total calorie intake results from food prepared within the home, whereas 32% of calories are consumed away from the home (Story et al., 2008). Researchers estimate consumers spend over half of their food dollars outside the home (Rosenbloom, 2010). Factors associated with healthful behaviors in the home include availability and accessibility of healthy foods, the frequency of family meals, and parental intake and parenting practices (for children's diets) (Story et al., 2008). The trend of Americans eating out more often is concerning since food consumed away from home is often more calorie dense and of poorer nutritional quality (Story et al., 2008). Additionally, restaurants often encourage overconsumption by serving large portion sizes (additional explanation below) (Story et al., 2008). Burton, Creyer, Kees and Huggins (2006) found consumers may underestimate their actual caloric content by as much as 50%.

Nieuwenhuizen, Weenen, Rigby, and Hetherington (2010) outline factors that affect food intake as being related to the person, environment or product. The authors claim good health and motivation are personal factors that promote intake (Nieuwenhuizen et al., 2010). From an environmental perspective, distractions, convenience, encouragement by care givers, sharing a meal with others, and eating at the same time every day promote food intake (Nieuwenhuizen et al., 2010). Finally, foods with high fat content, high palatability, appetizing appearance, and variety promote food intake (Nieuwenhuizen et al., 2010).

Wansink (2004) also examines environmental influences, although he focuses on the physical and social environment and largely ignores macro-level factors. Wansink (2004) outlines four consumption drivers in the individual's eating environment, including 1) eating atmospherics, 2) eating effort, 3) eating with others, and 4) eating distractions.

Eating atmospherics refer to “ambient characteristics that influence the immediate eating environment- such as temperature, lighting, odor and noise (Wansink, 2004, p. 460).” For instance, the body's need to regulate its temperature calls for an individual to consume more during cold temperatures vs. hot temperatures.

While temperature has a direct influence on consumption, lighting, odor and noise have a more indirect (mediating) impact (Wansink, 2004). Soft lighting increases eating duration and increases comfort and disinhibition (Wansink, 2004). Further, unpleasant odors shorten the duration of a meal and suppress individual's food consumption (Wansink, 2004). Moreover, Wansink (2004) reports that both extremes of music (soft and comforting versus loud and irritating) increase consumption, but in different ways. Soft music encourages longer meals and a slower rate of eating resulting in higher consumption of food and drinks. Loud music or noise can lead to individuals overeating without monitoring their intake as they try to leave the restaurant as quickly as possible.

Wansink's second consumption driver, eating effort, is one of the strongest influences on consumption (Levitsky, 2002; Wansink, 2004) and is related to how easily a food can be consumed. Foods that are convenient for an individual to access are consumed in higher quantities, especially when the foods are ready to eat (Chandon and Wansink, 2002; Wansink, 2004).

The third consumption driver, eating with others, can also increase how much an individual consumes because it can lead to an extended meal, can provide a consumption norm based on much the other people eat, can reduce an individual's motivation to monitor consumption, and can make the meal more relaxing and enjoyable (Wansink, 2004). De Castro (2000) found meals eaten with one other person were 33% larger than those eaten alone, judged by the amount eaten.

Eating distractions can also increase consumption by obscuring one's ability to monitor consumption, by initiating a habitual consumption script (such as popcorn during a movie), and/or extending the duration of the meal (Wansink, 2004).

Wansink (2004) also reported "Five S's of the food environment," which are food-related environmental factors that influence consumption volume but are unrelated to palatability. These factors include salience, structure, size, whether it is stockpiled, and how it is served.

The act of seeing or smelling a food (salience) can stimulate salivation and increase reported hunger (Wansink, 2004). Increasing the variety of a food (structure) can increase the consumption volume of the food (Rolls, 1986). Additionally, buying in bulk and stockpiling food can lead to overconsumption (Chandon and Wansink, 2002). Wide or large containers can create an illusion that one is consuming less than they are (known as the size-contrast illusion) (Wansink, 2004).

As mentioned above, larger packages and portion sizes can also increase consumption (Scott et al., 2008; Wansink, 2004). Scott et al. (2008) found restrained eaters consume more calories from small food in small packages, theorizing their overconsumption results from a lapse in self-control and stress due to conflicting food

information. The authors posit small food in small packages is viewed as both diet food and high in calories (Scott et al., 2008). Alternatively, unrestrained eaters consume more calories from large food in a large package.

Studies have shown that all of these aforementioned situational factors may affect an individual's eating behavior. Most experts agree that consumers must be armed with nutritional information at the point of choice to create awareness and promote more healthful choices (Story et al., 2008). It is believed providing calorie information at the point-of-purchase will help consumers limit their excess calorie intake (Harnack et al., 2008). In the absence of calorie information, research has shown consumers widely underestimate the caloric content of menu items (Burton et al., 2006).

As of 2006, only about 44% of the top 300 restaurant chains provided nutrition information to consumers, and most of those who did offered it via their website (not at the point of choice) (Wootan and Osborn, 2006). In 2010, Congress passed a health care reform law, which included a provision requiring chain restaurants with over 20 locations to provide caloric information on their menus and drive through signs.

Restraint theory suggests restrained eaters are more cognitively concerned with food and weight than unrestrained eaters (Polivy, 1996). Thus, they will be more interested and pay more attention to menu calorie information, whereas unrestrained eaters will care less since they rely on internal feelings of satiety.

Personal Characteristics

Story et al. (2008) cited five groups of individual level factors that affect eating decisions, including cognitions, skills and behaviors, lifestyle, biological, and

demographics. Cognitions may include attitude, preferences, knowledge, or values (Story, et al., 2008). Biological factors may include gender, genes or age (Story et al., 2008). Finally demographics may include factors such as income, race or ethnicity (Story et al., 2008).

Chandon and Wansink (2007) noted two conflicting individual goals may be encountered when making a food decision: taste enjoyment and maintaining good health. Studies have shown priming the taste enjoyment goal may trigger less healthy food choices (Shiv and Fedorikhin, 1999). Joint presentation of a healthy and unhealthy option may result in the individual choosing the healthy option because of the guilt and the difficulty justifying the latter (Okada, 2005).

Scott et al. (2008) found conflicting food information can cause high levels of stress in restrained eaters. Wansink and Chandon (Chandon and Wansink, 2007; Wansink and Chandon, 2006) had previously argued restrained eaters consume more when health-claims are present because they feel less guilt. Scott et al. (2008) found restrained eaters were perpetually in their 'hot system,' which triggered a loss of self-control and stress when given conflicting information about food, such as dietary categorization (small food in small packages is more like diet food) and perceived caloric content (small food in small packages is higher in calories).

Recent research indicates psychological and environmental factors are more important in obesity studies than genetic/biological factors (Guerrieri et al., 2008; Levitsky, 2005). Studies have shown higher levels of impulsivity in obese populations, and that impulsivity is an obstacle in the treatment of obesity (Guerrieri et al., 2008).

Impulsivity

Several researchers have found the general trait of impulsivity is related to overeating and weight gain (Guerrieri et al., 2008; Jansen et al., 2009). Impulsivity is generally defined as a tendency to think, control and plan insufficiently, which mostly results in an inaccurate or maladaptive response (Guerrieri et al., 2008; Jansen et al., 2009). It is considered to be a multidimensional construct because correlations between self-report measures and behavioral measures of impulsivity are generally weak, indicating it may be an “umbrella concept” (Guerrieri et al., 2008). In other words, it may be a group of related concepts, which several researchers believe include the following: response inhibition/premature responding, sensitivity to reward, and a self-reported personality trait (Guerrieri et al., 2008).

Impulsivity is operationalized in most of these studies as the inability to inhibit basic motor responses. The response inhibition facet of impulsivity is measured behaviorally with a Stop Signal Task (SST; Logan, Schachar, and Tannock, 1997). In marketing, the Barratt Impulsiveness scale (Patton and Stanford, 1995) and Rook and Fisher’s impulsivity scale (Rook and Fisher, 1995) have both been used as self-report measures of impulsivity.

Nederkoorn, Guerrieri and associates have shown impulsivity has many negative effects on restrained eaters. Specifically, impulsivity has been shown to increase intentions to diet (Nederkoorn, Eijs, and Jansen, 2004), increase food intake and overeating (Guerrieri, Nederkoorn, and Jansen, 2007), increase weight and obesity (Guerrieri et al., 2008), and decrease weight loss during weight reduction treatment (Nederkoorn, Jansen, Mulkens, and Jansen, 2007).

Jansen et al. (2009) found an interaction between restraint and impulsivity, such that high-restrained eaters only overate when they were also impulsive. Jansen and associates suggest examining whether interactions between restraint and reward sensitivity or the inability to delay gratification will result in the overeating of high-restrained eaters (Jansen et al., 2009).

In the marketing realm, Kidwell, Hardesty and Childers (2008b) evaluated obese individuals in regards to their impulsivity and emotional intelligence (discussed later). Obese impulsive individuals were found to consume more calories when they are miscalibrated emotionally, whereas calibrated individuals make higher-quality food decisions (Kidwell et al., 2008b).

Personality Traits

Elfhag and Morey (2008) examined what personality traits were prominent in restrained eaters. They found restrained eating was positively related to conscientiousness, extraversion (specifically warmth and positive emotions), and openness (particularly aesthetics, feelings and actions). Restraint was negatively related to neuroticism (specifically anxiety and vulnerability). Analyzing gender effects in their sample, restrained eating was best predicted by lower anxiety in men, and lower vulnerability and higher achievement striving for women.

Polivy (1996) reported restrained eaters have been found to be more neurotic, anxious, and narcissistic than unrestrained eaters. Restrained eaters also have been found to have more stress and lower self-esteem than their counterparts (Polivy, 1996).

Clearly, there are many situational and personal characteristics that contribute to different eating decisions between restrained and unrestrained eaters. I hope to add some clarity to which factors are more important in studies one and two.

Summary

In summary, restraint theory originated with Schachter (1968, 1971) and Nisbett's (1972) theories of obesity. Herman and Polivy developed their restraint theory (Herman and Polivy, 1980) based on this theoretical foundation. There are two restraint hypotheses: 1) Disinhibition, where an individual exhibits patterns of dieting and overindulgence and events interfere with their cognitive control. 2) Different levels of restraint for obese and normal weight individuals.

Three different scales have been used to measure restrained eaters. The Restraint Scale (Herman and Polivy, 1980), Dutch Eating Behavior Questionnaire (Van Strien et al., 1986), and the Three Factor Eating Questionnaire/Eating Inventory (Stunkard and Messick, 1985). All three offer advantages and disadvantages and are thought to mostly measure the same construct. A notable exception is the weight fluctuation component of the RS. The RS has been used most frequently by researchers to categorize eaters into the restrained vs. unrestrained categories. Since these measures have been frequently debated, I will examine all three restraint scales in study one.

Finally, several situational and personal characteristics influence restrained eaters' behavior. Physical and social environments have been used to categorize situational characteristics. Some examples mentioned in the literature include atmospherics, eating effort, eating with others, distractions, salience of the food, portion size, stockpiling of

food, and large containers. Furthermore, many personal characteristics affect restrained eaters' decisions, such as cognitions, skills and behaviors, lifestyle, biological factors, demographics, level of impulsivity, and personality factors (i.e. neuroticism, anxiety, extraverted, etc.).

CHAPTER 3

HYPOTHESES

Impulsivity

Several studies have found restrained eaters have a basic lack of inhibitory control (Nederkoorn et al., 2004). Nederkoorn et al. (2004, p. 1652) defines an impulsive response as “one that is executed with insufficient forethought, planning, or control, and is therefore inaccurate or maladaptive.” If someone lacks inhibitory control, immediate gratification will rule over long-term consequences (Nederkoorn et al., 2004).

Numerous populations have been found to possess more impulsivity than others. Bulimic patients have proven to be highly impulsive (Nederkoorn et al., 2004). Nederkoorn, Smulders, Havermans, Roefs, and Jansen (2006) found obese women were more impulsive (measured behaviorally) than their normal weight counterparts. Nederkoorn, Houben, Hofmann, Roefs, and Jansen (2010) found impulsive individuals gained more weight than participants with more effective response inhibition, but only when the participant had a strong implicit preference for snack food.

Guerrieri, Nederkoorn, and Jansen (2008) stated it’s difficult to assert highly impulsive individuals have a harder time resisting food because actual food intake is rarely measured in impulsivity studies.

Guerrieri, Nederkoorn, Schrooten, Martijn, and Jansen (2009) cognitively primed participants with the concepts of either impulsivity or inhibition. Caloric intake was higher in the impulsivity condition as opposed to the inhibition condition. The impulsivity effect was exaggerated in restrained eaters (Guerrieri et al., 2009).

In study two, the authors manipulated behavioral instructions to induce impulsivity vs. inhibition. Again, caloric intake was higher in the impulsivity condition; however with no difference in restrained and unrestrained eaters this time (Guerrieri et al., 2009). The authors concluded that, at least in unrestrained eaters, heightened impulsivity results in higher caloric intake.

Nederkoorn and colleagues (2004) found restrained eaters to have a specific deficit in response inhibition and are more anxious in general than low restrained eaters.

Guerrieri et al. (2007) primed impulsivity in healthy participants to determine if impulsivity causes overeating and obesity. Primed impulsivity and restraint did not predict food intake, however impulsivity (as measured by the behavioral and self-report measures) did predict food intake (Guerrieri et al., 2007). These findings support the notion that impulsive people overeat more easily. Guerrieri and associates (2007) found no support that impulsivity mediates the effect of restraint on food intake. They hypothesized that their sample had less extreme restraint scores than Nederkoorn et al.'s (2004) sample since the latter used only participants who scored below 6 or above 15 on the restraint scale in a pre-test.

Jansen et al. (2009) found an interaction effect for restraint and impulsivity. In other words, high restrained eaters only overeat when they're also impulsive. The authors concluded that overeating isn't inevitable for restrained eaters. Overeating is only a concern with a restrained eater who is also highly impulsive (Jansen et al., 2009). Similarly, I expect impulsivity to act as a moderator as well.

Hypothesis 1: *Impulsivity will moderate the relationship between restrained eating and unhealthy eating behaviors, such that more impulsive restrained eaters will have more unhealthy eating behaviors.*

Consumer Emotional Intelligence

Consumer Emotional Intelligence (CEI), otherwise known as emotional ability, “represents a person’s ability to skillfully use emotional information to achieve a desired consumer outcome” (Kidwell et al., 2008b, p. 612). The CEIS incorporates four reflective first-order dimensions, including perceiving, facilitating, understanding, and managing emotions.

Mayer, Caruso, and Salovey (1999) defined perceiving emotions as the ability to perceive, appraise and express emotions accurately. Facilitating emotion is the ability to access, generate and use emotions to facilitate thought (Mayer and Salovey, 1997). Understanding emotion is the ability to analyze complex emotions and to form emotional knowledge (Mayer and Salovey, 1997). Managing emotion is the ability to regulate emotions to promote a desired outcome (Mayer and Salovey, 1997).

Kidwell et al. (2008a) found high EI scores, specifically in the understanding and managing emotions dimensions of the CEIS, were most predictive of total calories.

Hypothesis 2: *Given access to calorie labeling, an individual with high emotional intelligence (EI) will make healthier eating decisions than individuals with low EI when impulsivity is at its mean.*

Hypothesis 3: *Given access to calorie labeling, an individual with low impulsivity and high EI will make a healthier (less caloric) decision as opposed to low EI, highly impulsive individuals.*

Figure 2 is the model my first three hypotheses set out to investigate.

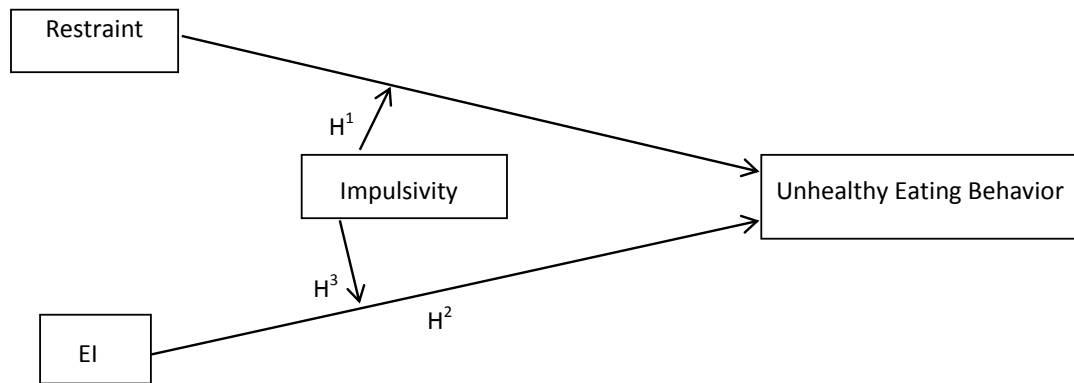


Figure 2. Study 1 Model

Health Information Presentation

The recent Affordable Care Act legislation hopes to lead individuals to make healthier eating decisions by providing calorie information. There is much debate concerning whether or not the menu calorie labeling will accomplish the goal of encouraging consumers to make healthier decisions. The legislation was passed in 2010, but the U.S. Food and Drug Administration (FDA) has yet to enforce it, citing complex issues and additional guidance needed to comply (Wei and Miao, 2013).

Three results may occur: 1) they may ignore the information (my hypothesis for unrestrained eaters), 2) they may choose to order a healthier option, or 3) they may eat less of their original order.

Several studies explore eating a healthier option than their original order.

Yamamoto, Yamamoto, Yamamoto, and Yamamoto (2005) showed McDonald's, Panda Express and Denny's menu's without nutritional information to adolescents first and asked them to choose what they would eat for dinner. After making their choice, they were asked to make the choice again but instead shown menus with caloric information included. The calorie information did not change the decisions made for a majority of the participants. Twenty-nine percent of individuals did change at least one of their orders. Of the orders that were changed, about half (43/93) resulted in a decrease in calories. Thirty-three percent (9/27) of individuals who characterized themselves as too fat or slightly overweight changed their orders.

Conversely, Cranage, Conklin, and Lambert (2005) found nutrition labels made a difference in female's decisions concerning where to eat. Females also reported a significantly greater tendency than males to use the nutrition labels while making food choices. Additionally, females chose menu items with lower calories and fat. Obese females selected salads, vegetables, soups, fruits and low-fat dairy more when calorie information was present.

Similarly, Gerend (2009) found the presence of calorie information did affect women's food decisions, but not men's selections. Students were randomly assigned to either the calorie viewing or non-calorie viewing condition and given a McDonald's-like menu to make their selection. The presence of calorie information did not significantly alter what the men chose. Women who viewed the calorie information chose lower calorie meals, lower calorie items, and lower priced meals.

A few studies have investigated the third option of eating less of their original order. Two studies suggest that calorie information has different effects on restrained and unrestrained eaters. First, Kirschenbaum and Tomarken (1982) investigated restrained and unrestrained women eaters using the preload plus taste test (of ice cream) procedure. They examined two potential methods to promote regulatory eating, smaller bowl size and the presence of caloric information. The authors found the interaction of the small bowl and calorie information caused restrained eaters to consume in a manner similar to unrestrained eaters. Further, participants who took many and bigger spoonfuls consumed more in this study.

Second, Kral, Roe, and Rolls (2002) had normal-weight women eat breakfast, lunch and dinner in a lab on three separate occasions. The energy density of their food was varied between days. Low energy density is associated with more fruits and vegetables, or higher water content. Participants ate about 22% more on the high energy density day than on the low. Participants were also split into two groups and were either given nutritional information or not. No differences were found between these two groups. More interestingly, restrained eaters who did not receive nutritional information ate significantly less low energy density food than unrestrained eaters. However, no differences in eating behavior were found between restrained and unrestrained participants in the group that received nutritional information.

A few more studies have examined both food choices and intake simultaneously. Aaron, Evans, and Mela (1995) monitored food choices in a cafeteria on two separate weeks. Week one had no accompanying nutritional information, whereas week two did incorporate nutritional information. The authors found no significant change in eating

patterns for restrained eaters or females between week one and two. Conversely, unrestrained eaters and males actually increased their consumption of calories, fat and carbohydrates in week two, when nutritional information was present.

Harnack et al. (2008) manipulated a McDonald's menu to include or not include calorie information. Participants were asked to purchase and consume a meal from the menu. Results found the presence of caloric information had little effect on food selection and consumption. Harnack et al. (2008) reported seven other studies had examined the effect of calorie labeling at the point-of-purchase to date, and six of the seven found the presence of the calorie information positively influenced food choices (Balfour, Moody, Wise, and Brown, 1996; Burton et al., 2006; Cinciripini, 1984; Conklin, Cranage, and Lambert, 2005; Milich, Anderson, and Mills, 1976; Yamamoto et al., 2005). Still, the findings were weak or inconsistent in most of the studies.

In the realm of consumer behavior, numerous researchers have examined the obesity epidemic. They have focused on one of two domains, the role of external nutrition information or the internal characteristics of customers (Andrews, Netemeyer, and Burton, 2009). Internal characteristics that have been investigated include motivation to search for information and nutritional knowledge (Andrews et al., 2009). Research has shown that consumers use nutritional information in the early stages of processing, but don't pay much attention to it after that (Andrews et al., 2009; Brucks, Mitchell, and Staelin, 1984). Wansink and Chandon (2006) suggest consumer knowledge regarding health and nutrition has little impact on their food decisions.

External nutrition information is primarily obtained through nutrition fact panels/health claims on the package and nutritional claims from advertising (Andrews et

al., 2009). The presence of health claims, such as low-fat or low-calories, may lead to consumer inferences that a product is healthier than it is. Wansink and Chandon (2006) found low-fat claims can lead to the underestimation of caloric content of food and higher consumption.

Andrews and associates (2009) found both internal and external factors are important in the consumer's eating decision. Further, their findings support the necessity of full and clear disclosure of less healthy foods for all consumers, regardless of knowledge and motivation (Andrews et al., 2009).

A large body of research exists concerning the Nutritional Labeling and Education Act of 1990 (NLEA). The main goal of the NLEA was to improve the availability and usefulness of nutritional information on food packaging (e.g. the Nutrition Facts panel) (Kozup, Creyer, and Burton, 2003). Restaurants and vending machines are a notable exclusion from the NLEA. Still, several researchers examined nutritional information formatting issues at that time and can inform this research on how restaurants should present nutritional information.

Kozup and colleagues (2003) was one of the few studies that examined this issue in the context of a restaurant setting. Findings suggest the target menu item is evaluated using the non-target menu items as a frame of reference. The authors also find that consumers are wary of product health claims. Hence, they will trust nutrition panel facts first; however, they will resort to advertising or packaging claims when nutrition panel information isn't available (Keller et al., 1997; Kozup et al., 2003). Therefore, consumers are sensitive to and interested in this information.

Since consumers frequently underestimate the number of calories in a menu item, proponents of the menu labeling legislation argue the availability of caloric information at the point-of-purchase will foster more healthy (less caloric) food decisions (Burton and Kees, 2011). The authors cited several possible impediments, including consumer's awareness, customer motivation, and knowledge of calorie information (Howlett, Burton, Bates, and Huggins, 2009). Furthermore, are consumer expectations of calorie levels consistent with actual caloric levels, do habits play a role, do other beliefs have an effect, and do situational influences have an effect?

A few possible benefits of the legislation include encouraging restaurants to reduce portion sizes, the introduction of new lower calorie healthy items, and decreasing the calorie content of less healthy high volume products.

Swartz, Braxton, and Viera (2011) completed a literature review (for the 2008-2011 time period) on the topic of calorie labeling. They argue calorie consumption isn't effectively lowered through calorie labeling since only two of seven recent studies on the topic found a significant decrease in calories when ordering from a calorie labeled menu (Swartz et al., 2011).

Lando and Labiner-Wolfe (2007) conducted focus groups on behalf of the FDA and found consumers were interested in having calorie information available, although they wouldn't use it on every occasion. They also thought a signal that an item is more helpful (signposting) could be helpful.

Morley, Scully, Martin, Niven, Dixon, and Wakefield (2013) found respondents in the no calorie listed condition selected significantly more calories than those in the

calorie listed condition (around 120 calories). These respondents reported commonly using traffic light signals in their decisions.

Pang and Hammond (2013) also found consumers in the calorie labeled menu condition selected fewer calories than those in the no calorie labeled menu condition. Those who saw calorie labels and an accompanying health statement also selected significantly fewer calories.

Bassett et al. (2008) found Subway patrons who saw the posted calorie information purchased 52 fewer calories than other Subway patrons.

Roberto, Larsen, Agnew, Baik, and Brownell (2010) found study participants in the two conditions where calorie labels appeared on their menu ordered 14% less calories than the no calorie label group. Further, participants in each of the calorie label groups separately ordered fewer calories than the no calorie label group. The authors also found adding a daily recommended caloric intake amount to the menu decreased calorie intake, suggesting policy-makers should consider including this label (Roberto et al., 2010).

Several studies have found consumers to have very little understanding of the nutritional content in meals, especially unhealthy ones (Burton, Howlett, and Tangari, 2009; Chandon and Wansink, 2007; Wansink and Chandon, 2006). While this implies that calorie labeling should help inform their understanding, Burton et al. (2009) found the relationship between the actual and expected nutritional information is what drove participant's responses, rather than just the disclosure of the information itself (Burton et al., 2009).

Elbel and colleagues have found evidence against calorie labeling. Elbel, Kersh, Brescoll, and Dixon (2009) surveyed individuals in NYC (where labeling had been

mandated) and in New Jersey (where it had not). The authors found about 28% of survey respondents reported their choice was influenced by the posted calorie information. However, the researchers didn't detect a significant difference in calories consumed after the introduction of the calorie labeling (Elbel et al., 2009). A similar approach was taken in Elbel, Gyamfi, and Kersh's (2011) research, but adolescents and children were the population of interest as opposed to adults. Again no significant difference in calories consumed occurred from pre-labeling mandate to post-labeling mandate. Further, fewer adolescents paid attention to this information than adults. Fifty-seven percent noticed the calorie information, yet only 9% reported considering the calorie information in this sample. Two important notes concerning these studies were that they took place in low income cities and were primarily minority samples. Additionally, the survey population differed from the pre-test to post-test.

Liu, Roberto, Liu, and Brownell (2012) gave a group of participants a calories listed menu and another group of participants no calories listed. These authors found no significant differences on the number of calories ordered between the no calories and the calories conditions.

Bates, Burton, Huggins, and Howlett (2011) found consumers need the help of nutrition labeling to identify menu item content. Roseman, Mathe-Soulek, and Higgins (2013) found consumers with higher nutritional knowledge made better decisions than other regardless of the presence of calorie information. Wei and Mao (2013) found calorie information interacts with perceived healthfulness of restaurants.

Despite these few studies with no effects found, I expect the presence of calorie information will contribute to healthier consumption patterns, particularly among

restrained eaters. Restrained eaters are chronically dieting, which means they are very interested in what and how much they are consuming in order to not surpass their self-imposed ‘diet boundary.’ Polivy (1996) echoes restrained eaters are more focused on food and weight-related information than their unrestrained counterparts. Cranage et al. (2005) found obese (restrained) eaters did in fact make healthier decisions when calorie information was present. Unrestrained eaters are more likely to eat what they want and rely on internal satiety cues to tell them when they’re full. Therefore, they are less interested in the caloric content of the foods they choose to eat. Hence,

Hypothesis 4: Restrained eaters will spend a longer time evaluating calorie information than unrestrained eaters.

Eye Tracking

Hypothesis 4 will be examined using an eye tracking device. In previous eye tracking research, Nijs et al. (2009) argues the incentive sensitization theory (Robinson and Berridge, 1993) is an addiction theory particularly relevant to the obesity epidemic. In summary, the theory posits a sensitization of the reward system increases the salience of reward-related cues in the environment, such as food. Thus, the cue grabs one's attention, promoting craving and intake of the rewarding food (Nijs et al., 2009). Nijs et al. (2009) examined two variables: the sum of eye fixation durations to gauge how long the participant maintained attention, and where they first fixated to measure where they initially directed their attention. In study 2, I am interested in the former, i.e. how long restrained eaters attend to calorie information. Since the goal of study 2 is to investigate whether or not restrained eaters will utilize calorie information that is now required on

menu's, my goal is to look at sustained attention toward the calorie information. This is best indicated by how long they fixate in total on this information.

Antunez et al. (2013) cited a majority of people don't use nutrition information to make their food-related decisions (Cowburn and Stockley, 2005; Graham, Orquin, Visschers, 2012; Grunert and Wills, 2012), despite up to 71% of individuals who are asked directly claiming they do look at health information and claims (Nayga, Lipinski, and Savur, 1998). The self-report method may lack construct validity in this situation where the participant may be more inclined to respond in a socially desirable manner. Hence, the eye tracker will be an important tool to unobtrusively observe what consumers do look at and for how long. Additionally, eye movements are closely related to higher-order cognitive processes, and are therefore good behavioral indicators for measuring attention (Antunez et al., 2013).

Van Herpen and Van Trijp (2011) note attention can come from two approaches: 1) bottom-up factors in the stimulus environment, such as label position or type of label, and 2) top-down factors in the viewer, such as consumers' goals or time restraints (Pieters and Wedel, 2004).

Van Herpen and Van Trijp (2011) concluded (based on Grunert and Wills, 2007, schema), that in order for nutrition information to have an impact on decision-making, three activities need to occur. First, it needs to be initially appealing. Second, it needs to be attended to and processed. Third, it should be used as a basis for decision-making.

A few studies have looked at consumer's visual attention to nutrition labeling using an eye tracking paradigm, specifically included here are Visschers, Hess, and Siegrist (2010), Goldberg, Probart, and Zak (1999), and Jones and Richardson (2007).

These studies have to do with nutrition facts labels, not menu calorie labeling. To the author's knowledge, no studies exist using an eye tracker to examine consumer's attention to menu calorie labeling.

Vischers et al. (2010) found 66% of their study participants perceived the nutrition information in their experiment. These authors also found respondents with a health motivation presumably engaged in deeper processing of the nutrition information, as they had a longer mean gaze duration.

Goldberg et al. (1999) examined specific design components concerning nutrition labels. For instance, they found targets near the center of the label required 33% more time to locate and were harder to find than targets at the top or bottom of the label (Goldberg et al., 1999). Further, thinner alignment lines were more influential on visual search time than thicker anchoring lines (Goldberg et al., 1999). Not surprisingly, practiced label readers found the target more easily than inexperienced label readers (Goldberg et al., 1999).

Self-regulation and Mindful Eating

Self-regulation has been considered as it relates to dietary restraint. Self-regulation is the suppression of a behavioral impulse to a 'lower-level' goal (short-term impulse to eat) in pursuit of a 'higher-level' goal (long term weight maintenance objectives) (Johnson et al., 2011). Self-regulation strategies may consist of self-control strategies or acceptance-based strategies. Previous research has suggested strategies for dealing with impulsive reactions to attractive food stimuli, including planning ahead and training new responses (Papies, Barsalou, and Custers, 2012).

In accordance with self-regulation theory, Ward and Mann (2000) argue there are three components of self-regulation. An individual would 1) set a standard they wish to attain, 2) engage in a monitoring process where they compare their current state to their ideal state, 3) operate a process to change the current state when it is inadequate compared to the standard. As it relates to food decisions, they would either set a standard that prohibits overindulgence, monitor their diet by counting calories, or operate a process to restrict future caloric intake based on a discrepancy between amount of food consumed versus the amount desired (Ward and Mann, 2000).

Satiation

Redden and various colleagues (Redden and Haws, 2013; Galak, Redden and Kruger, 2009; Galak, Redden, Kyung, and Yang, 2014; Redden, 2008) have taken a different approach to self-control by looking at satiation. They look at self-control as the battle between desire and willpower. The process of self-control is thought to include three aspects: setting clear standards, monitoring behavior, and regulating behavior (Redden and Haws, 2013; Baumeister, 2002).

In this research, satiation is defined as the drop in liking after repeated consumption (Redden and Haws, 2013). In the food context, the term points to the fact that people enjoy a food less as they eat more of it. Therefore, satiation is a way for the body to ensure it takes in a variety of necessary nutrients (Redden and Haws, 2013). Satiation is thought to include both psychological and physiological components (Redden and Haws, 2013). Satiation is temporary, as consumers will eventually experience “spontaneous recovery” (McSweeney and Swindell, 1999). Hence, the consumer will,

over time, again start to enjoy the food they once disliked. Attention is critical to satiation rates because increased monitoring has been shown to produce faster satiation rates (Redden and Haws, 2013).

Galak, Redden and Kruger (2009) noted people can limit satiation by either preventing it or limiting it after the fact. These authors cited several preventative measures to slow satiation rates, such as subcategorizing consumption episodes, consuming more slowly, or perceiving the variety of an assortment being consumed (Galak, Redden and Kruger, 2009). Further, recovery is fostered by the passage of time, exposure to a novel stimulus, or recalling the consumption of a variety of stimuli (Galak, Redden and Kruger, 2009).

However, as it relates to the obesity epidemic, one would hope to produce faster satiation in order to eat less, especially of unhealthy foods. Research has shown people reduce their consumption if they are reminded of a recent meal, have a sense they have previously consumed more, or imagine consumption (Galak, Redden, Kyung, and Yang, 2012).

Mindful Eating

Cognitive Behavior Therapy (CBT) is a large family of psychotherapy approaches that incorporates both behavioral and cognitive elements (Forman, Herbert, Moitra, Yeomans, and Geller, 2007). Cognitive Therapy (CT) is the most popular and the most researched CBT approach (Beck, 2005; Forman, et al., 2007). Butler, Chapman, Forman, and Beck (2006) reviewed 16 meta-analyses on the topic and found substantial support for the effectiveness of CT in treating mood and anxiety disorders particularly. CT

assumes an individual's thoughts, beliefs, and cognitions play a major role in their disorder, and therefore the therapeutic approach places emphasis on changing those cognitions (Forman et al., 2007).

Stemming from CBT (CT) are several so-called 'third-generation' behavior therapies (Hayes, 2004), including mindfulness-based cognitive therapy (MBCT), dialectical behavior therapy (DBT), mindfulness-based stress reduction (MBSR), acceptance and commitment therapy (ACT) and finally mindfulness-based eating (MB-EAT). These approaches borrow from and extend CT, but differ in one important way. They emphasize *accepting* (emphasis added) distressing cognitions rather than trying to change them (Forman et al., 2007).

"Mindfulness-based eating awareness" (MB-EAT) can be defined as a group intervention method that was developed for the treatment of binge eating disorder (Kristeller and Wolever, 2011). MB-EAT is a 10-session treatment program that incorporates four major principles, including cultivating mindfulness, cultivating mindful eating, cultivating emotional balance, and cultivating self-acceptance.

Mindfulness is thought to be cultivated through meditation mainly, focusing on the mindfulness qualities such as non-judgment, compassion, and self-acceptance (Kristeller and Wolever, 2011). The cultivating mindful eating component focuses on bringing awareness to hunger and satiety cues, as well as making mindful food choices (Kristeller and Wolever, 2011). Cultivating emotional balance helps an individual learn to identify and tolerate emotional triggers (to interrupt the chain of reactivity), as well as to modify comfort eating (Kristeller and Wolever, 2011). Lastly, cultivating self-

acceptance focuses on developing a better relationship with the self (including physical self, self-identity, and self in relation to others) (Kristeller and Wolever, 2011).

Several programs have been developed based on the mindful eating concept. An example is called “Eat for Life” at the University of Missouri. It is a 10-week program (in-class or online) and is a ‘non-diet approach to eating’ that emphasizes meditation and yoga. The goal is to listen to and accept your body (“Mindful Eating Program,” 2013). The program emphasizes the “B.A.S.I.C.S” of mindful eating. Specifically, they are belly check, assess your food, slow down, investigate your hunger, chew your food, and savor your food (“Mindful Eating,” 2011). Belly check means to consider if you are actually hungry, or if you’re just bored. Assessing means you notice the foods colors and smells, as well as eat what you truly want. Once you begin eating, slow down and enjoy what you’re eating. Investigate your hunger so you notice when you’re full and then stop eating. Chew thoroughly to help the body process the food easier. Finally, savor the food and enjoy it!

MB-EAT was drawn from three theories: self-regulation theory, neuro-cognitive and therapeutic models of mindfulness mediation, and models of food intake regulation (Kristeller and Wolever, 2011). Previous research on food intake indicates physiological hunger and satiety mechanisms are often overridden by external cues to eat, such as social cues, emotional cues or cravings (Kristeller and Wolever, 2011). Wansink (2004) outlines these cues. Further, self-regulation theory adds that internal regulatory processes in the body depend on one’s capacity to observe their internal states (Kristeller and Wolever, 2011). Neurocognitive research informs MB-EAT by supporting the value of

meditation practice as a way to cultivate attention, thereby encouraging self-regulation (Kristeller and Wolever, 2011).

Food cravings have been defined as an intense desire to eat a specific food (Alberts et al., 2010). There are two categories of coping strategies for individuals dealing with food cravings, including control-based strategies and acceptance-based strategies (Alberts et al., 2010). Control-based strategies, such as suppression or distraction, strive to decrease the frequency and intensity of cravings and have been used more often (Alberts et al., 2010). On the other hand, acceptance-based strategies are more in line with mindfulness techniques as they promote the willingness to experience the current state (craving) with a nonjudgmental attitude and without acting upon it (Alberts et al., 2010). Study three will examine whether acceptance strategies (such as mindfulness) can reduce food cravings.

In a recent study using a mindfulness intervention but not focused on eating, Mrazek, Franklin, Phillips, Baird, and Schooler (2013) found a 2-week mindfulness training course improved working memory capacity and GRE-reading comprehension scores, as well as reduced distracting thoughts. Participants were split into a mindfulness class group or a nutrition class group for a total of 3 hours of training for 2 weeks (4 – 45 minute sessions). The mindfulness class group was required to engage in 10 minutes of daily meditation, whereas the nutrition class group was asked to log their food intake. The mindfulness class focused on physical posture and focused-attention strategies, and resembled a Mindfulness Based Stress Reduction (MBSR; Grossman, Niemann, Schmidt, and Walach, 2004) program with just a few differences. MBSR is typically longer (8 weeks instead of 2), requires more time spent on exercises out of class, and used slightly

different mindfulness techniques. The nutrition class covered fundamental nutrition topics and healthy eating strategies. Participants took an adapted, abbreviated GRE one week before (pre-test) and one week after (post-test) the classes.

Several studies have examined the effectiveness of mindfulness-based eating specifically. Tapper et al. (2009) explored a mindfulness-based eating intervention. They found participants who participated in four 2-hour workshops and reported practicing the workshop principles had significantly higher levels of physical activity and significantly lower levels of BMI than controls after 6 months. The authors found the reduction in BMI was mediated primarily by reductions in binge eating (Tapper et al., 2009).

Papies et al. (2012) found mindfulness prevents impulsive attractions towards food. In a series of three studies, participants first received a brief mindfulness training procedure where they were taught to observe their reactions as mental events rather than subjectively real experiences. Then they applied this procedure to viewing pictures of other highly attractive or neutral food items. Finally their reactions to food stimuli were assessed with an implicit approach-avoidance task. These authors found that mindfully observing one's reaction during food exposure prevents the creation of food impulses and offers support for the notion that mindfulness can potentially support self-regulation of eating behaviors (Papies et al., 2012).

Both of the studies mentioned used brief mindfulness-based interventions (Papies et al., 2012; Tapper et al., 2009), likely for convenience purposes. However, Alberts et al. (2010) used a more extensive mindfulness training by offering a 7-week manual-based training for obese/overweight participants in the experimental group to follow

independently. Results showed individuals who participated in the training group reported significantly fewer food cravings than individuals in the control group (Alberts, et al., 2010). The acceptance-based training was found to reduce the extent to which participants experienced a loss of control when exposed to food cues, decreased participants' pre-occupation with food, and reduced the perceived reinforcing value of food (Alberts et al., 2010).

Alberts, Thewissen, and Raes (2012) conducted an 8-week mindfulness intervention with women who had eating disorders and measured them at the baseline and post-intervention. They found women who completed the mindfulness intervention had significantly greater differences in food cravings and emotional eating.

Dalen, Smith, Shelley, Sloan, Leahigh and Begay (2010) also conducted a mindfulness intervention, and found participants showed significant increases in mindfulness and cognitive restraint related to eating, as well as decreases in weight and binge eating compared to baseline.

Two literature reviews have emerged recently (Godsey, 2013; Keng, Smoski and Robins, 2011). Godsey (2013, p. 438) reviewed the literature on mindfulness and found there is conclusive evidence that mindfulness based options provide a "promising option in the treatment of obesity other eating disorders."

Keng et al. (2011) echo these findings and say there is divergence amongst correlation, laboratory, and clinical studies that mindfulness interventions bring about positive changes in psychological health.

Bahl, Milne, Ross, and Chan (2012) is the first study, to my knowledge, to examine mindfulness in the marketing literature. These authors found college students

who practiced mindfulness techniques engaged less in poor eating habits. Further, mindfulness was negatively related to overeating and skipping meals. These authors did not put participants through any kind of mindful eating training. They simply used participants who had participated in mindfulness techniques previously, such as yoga, tai chi and meditation. In addition, this study further refined a mindfulness scale from Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) that combined five mindfulness self-report scales from the clinical psychology literature (discussed in Chapter 4).

Practicing mindfulness forces consumers to engage in more extensive processing, which should result in healthier decisions. Further, it emphasizes that food craving is just a transient mental state, encouraging an individual to view it accordingly. Further, the possession of impulsiveness will still harm the restrained eater's decision despite the mindfulness intervention.

***Hypothesis 5:** A mindfulness intervention will influence restrained eaters to make healthier (more mindful) eating decisions.*

Summary

In summary, restrained eaters have been found to be more impulsive than their unrestrained counterparts due to increased inhibition. Therefore, I expect restrained eaters who are high in impulsivity will make less healthy eating decisions. Further, the Affordable Care Act has attempted to help curb the obesity epidemic by requiring major chains to post calorie information at the point-of-purchase. Several studies have found the presence of calorie information will affect women's decisions especially, who coincidentally are typically more frequently restrained eaters than men. Studies have been

inconclusive on whether or not the presence of calorie information makes a significant difference due to weak and inconsistent findings.

Additionally, I expect individuals with high EI should make healthier decisions due to being able to better manage their emotions.

Lastly, psychology researchers make a strong case for acceptance-based self-control strategies. Of the cognitive therapy strategies considered, mindful eating has been shown to have promise for battling obesity. I expect the mindfulness intervention I conduct will reduce food cravings and decrease impulsivity in the experimental group.

CHAPTER 4

STUDY 1 METHOD

Study 1

The objective of study one is to investigate the relationship between emotional intelligence, impulsivity and unhealthy eating behaviors. Hypothesis 1 examines the moderating effect of impulsivity on a restrained eater's food decisions. Hypothesis 2 states an individual with high EI will make a healthier eating decision than an individual with low EI when presented with calorie information. Finally, hypothesis 3 investigates if an individual with low impulsivity and high EI will make a healthier decision than low EI, highly impulsive individuals. In summary, hypothesis 1, 2 and 3 will be explored in study one.

Sample

A sample of 287 participants from a large Midwestern university participated in the study. The students were offered extra course credit to participate. Six participants were excluded due to an insufficient number of responses. Of the remaining 281 respondents, 160 (57%) were male and 121 (43%) were female. Missing data was determined to be missing completely at random and was computed to be an average of responses for that particular item. All studies (1-3) received approval from the Iowa State University Institutional Review Board.

Procedure

Students were invited to participate in the study in a campus computer lab. Upon entrance to the lab, they completed a computer-based evaluation of the menu shown in Appendix A. Participants were asked to select all the food they would want to eat to maintain a healthy diet in a 24-hour time period. Once they completed that activity, they were re-directed to an online survey containing the measures described below coupled with demographic questions. Finally, the last question thanked students for participating and told them as a token of my appreciation to select a snack item. The choices included three healthy items (granola bar, raisins, or baked chips) and three unhealthy items (skittles, snickers bar, regular potato chips). The experimenter gave them the snack they selected and the participant was thanked and dismissed.

Materials

In accordance with prior research (Harnack et al., 2008; Kidwell et al., 2008a; Roberto et al., 2010), the food menu used included multiple food categories, such as appetizers, hamburgers, sandwiches, wraps, pasta, soups, salads, side items, beverages and desserts. Prices were intentionally omitted in order to not confound the menu item choice with price considerations. Please see Appendix A to view the menu participants saw in study one.

Measures

Restrained Eating. Herman and Mack (1975) created the original restraint scale (RS) as a tool to identify chronic dieters. The scale was revised by Herman and Polivy

(1980) to a 10-item measure that assesses the extent to which individuals exhibit concern about dieting (Herman and Polivy, 1980). The RS includes two factors: concern for dieting and weight fluctuation. The restraint scale (Herman and Polivy, 1980) has 10 items: 6 items are specified for the factor of concern for dieting (CD) and 4 items for the weight fluctuation (WF) factor. See Table 1 for a list of the scale items and factors. Items in the RS are scored from 0-3 or 0-4, with higher scores indicating a restrained eater. The Cronbach's alpha for the concern for dieting and the weight fluctuation scales were identical at .672. The reliability of the linear combination of the restraint scale is .75.

Researchers have taken different approaches to determining restrained eaters. Some have used an arbitrary cut-off, such as a score of 15 (Goldman, Herman, and Polivy, 1991; Provencher, Polivy, and Herman, 2009). This becomes problematic, though, as different nationalities, such as the Dutch sample in Guerrieri et al. (2009), often score lower than Americans. Prior research has also used a median split, with the top scoring half indicating the restrained eaters and the bottom scoring half as unrestrained eaters (Drewnowski, Risky, and Desor, 1982; Herman and Polivy, 1980; Meule, Lukito, Vögele, and Kübler, 2011; Scott et al., 2008).

Three major problems have been identified with the RS; the confounding of dietary restraint with disinhibition, an apparent inadequacy when measuring the obese, and its factor structure (Heatherton et al., 1988). Additionally, Wardle (1986) found it difficult for participants to fill the RS out.

Table 1. Restraint Scale Measure**The Restraint Scale**

Question	Factor
1. How often are you dieting?	CD
2. What is the maximum amount of weight (in pounds) you have ever lost in one month?	WF
3. What is your maximum weight gain within a week?	WF
4. In a typical week, how much does your weight fluctuate?	WF
5. Would a weight fluctuation of 5 pounds affect the way you live your life?	CD
6. Do you eat sensibly in front of others and splurge alone?	CD
7. Do you give too much time and thought to food?	CD
8. Do you have feelings of guilt after overeating?	CD
9. How conscious are you of what you're eating?	CD
10. How many pounds over your desired weight were you at your maximum weight?	WF

Note. CD = Concern for Dieting. WF = Weight Fluctuations.

Heatherton et al. (1988) analyzed the factor structure of the restraint scale. Since there is debate concerning if the two factors measure the same construct, several researchers have examined the scale using factor analysis. Six of the nine studies found two factors exist, with most specifying the current concern for dieting (CD) and weight fluctuation (WF) subscales (Blanchard and Frost, 1983; Drewnowski et al., 1982; Heatherton, 1986; Polivy, Herman, and Howard, 1988; Ruderman, 1983). Blanchard and Frost (1983) confirmed the factors in two samples within the same study. Drewnowski et al. (1982) found items 1 and 6 loaded on WF instead of CD, as specified in the scale. Two studies found three factors (Johnson, Lake, and Maurice Mahan, 1983; Lowe, 1984), and one study found four factors (Ruderman, 1983) (sample 2). Both of the studies that found three factors found item 6 and 7 as the third factor (which both are specified in the scale as loading on the CD factor). In Ruderman (1983) sample 2, items 1 and 9 loaded on CD, 2, 3, 4, 5, and 10 loaded on WF, 6 and 8 on a third factor, and 7 and 10 on a fourth factor.

In accordance with this research, I also conducted a factor analysis on the restraint scale. Since the factors are assumed to be correlated, I used principal axis factoring with an oblique rotation (direct oblimin). Kappa was entered as 0. The sensitivity was tested with Kappa values of -4 and -100, and both yielded the same three factor construct.

As illustrated in Table 2, I found items 1, 2, 5, 6, 8, 9 and 10 loaded on CD. I found items 3 and 4 loaded on WF. Further, the third factor was comprised of item 7. In my sample, item 10 is problematic. Item 10 is specified as a weight fluctuation item in the scale, and in seven of the nine factor analyses reported it has loaded on WF. But it did load on the CD factor in two prior studies (Johnson et al., 1983; Lowe, 1984) and on a fourth factor in Ruderman (1983). When more than two factors have been reported, item 7 has been involved in every case (Johnson et al., 1983; Lowe, 1984; Ruderman, 1983). When I forced a two-factor solution, all items loaded on the same factor except for item 5. The correlation between factors is reported in Table 3.

Heatherton et al. (1988) attributed the studies reporting three or four factors (Johnson et al., 1983; Lowe, 1984; Ruderman, 1983) to the fact they consisted of a largely overweight/obese populations. The aforementioned studies reported 62.5%, 30.8% and 100% obese respectively. Only 11.6% (32 out of 276) of my sample is obese (BMI 30 or higher); therefore, this logic doesn't explain why I obtained three factors.

Table 2. Restraint Scale Factor Analysis

Factor Matrix			
	Factor		
	1	2	3
Item 1_CD	.503		
Item 2_WF	.599	.320	
Item 3_WF	.465	.703	
Item 4_WF	.332	.652	
Item 5_CD	.309		
Item 6_CD	.376		
Item 7_CD	.518		.579
Item 8_CD	.615		
Item 9_CD	.243		
Item 10_WF	.676		

Extraction Method: Principal Axis Factoring.

Table 3. Factor Correlation Matrix

Factor Correlation Matrix			
Factor	1	2	3
1	1.000	.147	.433
2	.147	1.000	-.062
3	.433	-.062	1.000

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser

Normalization.

In light of the restraint scale debate, this study also included the two alternative measures of restraint: DEBQ – restrained eating scale (Van Strien et al., 1986), and Eating Inventory (formerly Three Factor Eating Questionnaire; Stunkard and Messick, 1985). The Cronbach's alpha of the DEBQ is .891. The Cronbach's alpha of the Eating Inventory uncontrolled dimension is .84. The Cronbach's alpha of the Eating Inventory cognitive dimension is .761. The Cronbach's alpha of the Eating Inventory emotional eating dimension is .859. The Eating Inventory reliability of the linear combination is .875.

In Table 4, you will find the Pearson correlation matrix for the three measures of restrained eating, with both the overall restraint measure and the two sub-dimensions.

Table 4. Correlations between restrained eating measures

Pearson Correlations					
	Restraint Scale	Restraint_CD	Restraint_WF	DEBQ	Eating Inventory
Restraint Scale	1	.797**	.819**	.629**	.467**
Restraint Scale _ Concern for dieting	.797**	1	.306**	.678**	.543**
Restraint Scale _ Weight fluctuation	.819**	.306**	1	.353**	.223**
Dutch Eating Behavior Questionnaire (DEBQ)	.629**	.678**	.353**	1	.515**
Eating Inventory	.467**	.543**	.223**	.515**	1

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation matrix offers evidence of convergent validity given the three restraint measures (Restraint scale, Eating Inventory, and Dutch Eating Behavior Questionnaire) are all significantly correlated. There is little evidence of discriminant validity between the three restraint measures for the same reason. The Restraint scale and Eating Inventory ($r = .47$, $p < .001$) and the Restraint scale and Dutch Eating Behavior Questionnaire ($r = .63$, $p < .001$) appear to measure similar constructs.

Allison, Kalinsky and Gorman (1992) examined all three scales within the same sample, but reported few other studies have. This is advantageous since we can rule out method and sample differences as causing variance in the measures. These authors found evidence of convergent validity in their data as well, with all three scales highly correlated.

As seen in table 4, these data indicate the weight fluctuation scale has the least relation to all other restraint scales (DEBQ: $r = .35$; Eating Inventory: $r = .22$), including the concern for dieting sub-dimension of the restraint scale (Restraint - CD: $p = .31$). Similarly, Allison et al. (1992) also found the weight fluctuation factor to be unrelated to the Eating Inventory and DEBQ ($r = .15$ cognitive eating inventory, $r = .01$ behavioral eating inventory, and $r = .23$ for DEBQ).

Wardle (1986) argued the Eating Inventory and DEBQ include items measuring what the restraint scale concern for dieting subscale purports to measure. Some researchers suggest the weight fluctuation subscale of the restraint scale measures a different construct (Wardle, 1986; Williamson et al., 2007). Williamson et al. (2007) claim this suggests that the RS measures both intent to diet and susceptibility for overeating, while the DEBQ and Eating Inventory only measure the intent to diet construct. Williamson and colleagues (2007) state this may be because the weight fluctuation scale is difficult to fill out since it asks the participant to identify how much they have weighed at certain periods of time. Data in table 4 indicate the weight fluctuation scale has the least relation to all other restraint scales (DEBQ: $r=.35$; Eating Inventory: $r=.22$), including the concern for dieting sub-dimension of the restraint scale (Restraint - CD: $r=.31$).

On the other hand, Heatherton et al. (1988) reported the average correlation between the CD and WF dimensions is .48 ($SD=.19$) in the studies they analyzed. These authors argue the two dimensions have a “relatively strong correlation,” which proves they measure the same construct (Heatherton et al., 1988, p. 23). These authors rebut the assertion a scale cannot contain two or more correlated factors. They argue “the component factors must be statistically and conceptually related” (Heatherton et al., 1988).

In this research, the correlation between the two dimensions of restraint (concern for dieting and weight fluctuation) is .31 and highly significant at the $p=.01$ level. Based on Heatherton et al.’s (1988) review of restraint factor analysis studies, .31 is only more correlated than two of the seven studies they reviewed (Drewnoski et al., 1982: $p=.17$;

Lowe, 1984: $p=.28$). Heatherton et al. (1988) argue the two dimensions are similar enough to measure the same construct, but dissimilar enough to measure different aspects of the restraint concept. Additionally, they point out these correlations may be underestimated since factor analysis minimizes correlation among factors.

Consumer Emotional Intelligence Scale (EI). Designed to measure a consumer's ability to use emotional information, the EI scale was based on Mayer, Salovey, and Caruso's (2000) emotional ability models (Kidwell et al., 2008a). Mayer and colleagues also developed an emotional intelligence scale called the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, et al., 2003). This scale was designed as a general measure, applicable in a wide range of interpersonal contexts (Kidwell et al., 2008a).

The EI scale extends this scale to a consumer domain.

The EI scale consists of 18-items representing four factors, including perceiving, facilitating, understanding and managing (Kidwell et al., 2008a). Perceiving emotions is "the ability to perceive, appraise, and express emotions accurately" (Kidwell et al., 2008a; Mayer, et al., 1999). Facilitating emotions is "the ability to access, generate, and use emotions to facilitate thought" (Kidwell et al., 2008a; Mayer and Salovey, 1997). Understanding emotions is "the ability to analyze complex emotions and to form emotional knowledge" (Kidwell et al., 2008a; Mayer and Salovey, 1997). Finally, managing emotions is "the ability to regulate emotions to promote a desired outcome" (Kidwell et al., 2008a; Mayer and Salovey, 1997).

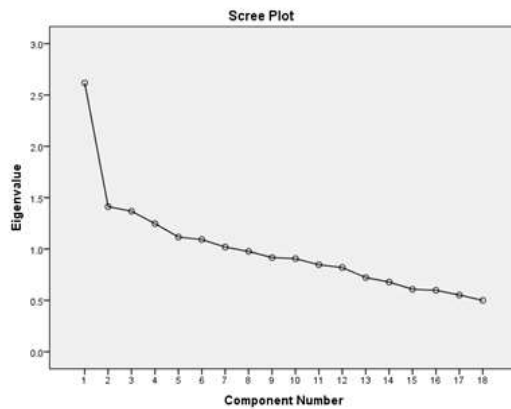
The EI scale was not reliable in this data with all scale items included. As reported on in Clark and Watson (1995), a factor analysis was used to determine the final

nine scale items used in this research (see table 5). Clark and Watson (1995) suggest the following steps for scale item selection using factor analysis: 1) extract the first five factors, 2) examine the loadings on the first component (which is considered to be the construct measured by the item pool), and 3) consider retaining items that load strongly on the first factor (over .35). The Cronbach's alpha for the revised EI scale is .64. Further, the Spearman-Brown split-half reliability is .65 and the Guttman split-half reliability is .63 (Kaplan and Saccuzzo, 2012). See Table 5 for the EI factor structure and scree plot. The first factor had a 2.62 initial eigenvalue, representing 14.54% of variance.

Table 5. Emotional Intelligence factor analysis

	1
Item 1	.388
Item 2	.466
Item 3	.392
Item 4	.646
Item 5	.576
Item 6	.403
Item 7	.453
Item 8	.480
Item 9	.628

Extraction Method: Principal Component Analysis.



Barratt Impulsivity Scale. The original BIS was developed by Ernest (1959). In my study, I will use the BIS-11 (Patton and Stanford, 1995), which is a self-report questionnaire that measures trait impulsiveness. The BIS has 30 items, rated on a four-point scale with possible responses “rarely/never,” “occasionally,” “often,” “almost always/always.” Scores on the BIS range from 30 to 120. Higher scores indicate more impulsiveness. The BIS consists of three sub traits: motor (acting without thinking), cognitive (making quick cognitive decisions), and non-planning impulsiveness (lack of orientation to the future) (Patton and Stanford, 1995). It is worth mentioning a few unpublished factor studies and Luengo, Carrillo-De-La-Pena, and Otero (1991) have had

difficulty replicating the cognitive dimension of the BIS (Patton and Stanford, 1995).

The Cronbach's alpha for the attentional impulsiveness factor was .72. The scale reliability for motor impulsiveness is .71, and .70 for non-planning impulsiveness. The reliability of the linear combination is .83.

There are many schools of thought on how to measure eating behavior. Dietitians advocate for behavioral measures that essentially ask the participant if they made healthy choices. Marketing journals appear to be most interested in 'laboratory based' measures of eating that are collected in a controlled setting due to an apparent concern for demand effects. De Castro (2000) points out while laboratory studies offer greater control, allowing the researcher to isolate independent and dependent variables, it is also problematic. First, the researcher needs to know which variables are important to investigate in advance or they may miss other variables that affect the eating behavior (De Castro, 2000). Further, many times participants will make decisions that are not their typical behavior in this setting. On the other hand, real word techniques, like food diaries, make it difficult to identify causal factors.

For this reason, I chose three dependent variables to tap into different aspects of unhealthy eating behavior and several different measurement techniques (self-report and food diaries). The dependent variables are Body Mass Index (BMI), daily caloric intake (DCI), and unhealthy snack selection. As illustrated by their correlations, none of the dependent variables are related to each other. BMI has a negative relationship with DCI ($r = -.07$) and unhealthy decision ($r = -.03$). DCI has a slight positive correlation with unhealthy decision ($r = .05$). None of the relationships are significant.

Several psychology studies examining restraint measure actual food intake following a preload, while numerous others investigate BMI. The nature of my study designs prevented me from looking at actual food intake in a laboratory setting (although I look at actual reported food intake in the form of a food diary for study 3).

BMI represents a more long term eating behavior measure because it is essentially the culmination of all eating decisions one makes. Numerous researchers use this measure because it is a quick and easy indicator of whether an individual is overweight. I believe this measure is more representative of an individual's continuous eating behavior because it does not rely on the participant's self-report of what they would hypothetically select to eat, which is subject to social desirability bias. Further, it is more likely to incorporate the binge episodes a restrained eater will experience after selecting the least amount of calories possible, to keep them within their dietary boundary.

The daily caloric intake measurement has also been used in previous research (Kidwell, Hardesty and Childers, 2008a; Kidwell, Hardesty and Childers, 2008b; Chandon and Wansink, 2007; Kozup, Creyer and Burton, 2003). The participant is asked to select all of the foods they would like to eat in one day. Kidwell et al. (2008a; 2008b) perform the exact same manipulation in their studies, where the participant is given the choice of three healthy and three unhealthy options.

A similar method to unhealthy snack selection was used in Moorman, Diehl, Brinberg, and Kidwell (2004) where shoppers chose a food and analysis was performed on the healthiness of that food selection at a later point. This method was disguised as a token of appreciation for completing the study, so it was a quick and easy way to stage a

more real life situation within a laboratory setting without drawing any attention to the decision actually being part of the experiment.

Body Mass Index (BMI). Body mass index is a measure to assess how much an individual's body weight deviates from a normal individual. The calculation used in this study is $[\text{mass (lbs)} / \text{height (in)}^2] * 703$. BMI is a dependent variable in the context of this study. BMI is calculated using this formula from the height and weight the participant provided in the survey.

Daily Caloric Value. Before they began the survey, participants were offered an online menu (see Appendix A). They were instructed to pick all of the food and beverages they would consume for a 24-hour period. The experimenter assigned caloric values to the menu items using nutritional guide websites, such as Calorie King. The higher the amount of calories chosen, the more unhealthy the eating behavior is.

Unhealthy Decision (Snack Selection). The third dependent variable was labeled unhealthy decision. At the conclusion of the online questionnaire, the participant was asked to select what snack they most wanted. They were given 6 options: a granola bar, raisins, baked chips, skittles, a snickers bar, or regular chips. Upon exiting the room where the survey was conducted, the participant was given the snack they selected. Additionally, unbeknownst to the participant, the item was included as an indicator of their eating behavior. The first three options listed were the 'healthy' option, and the last three options were the 'unhealthy' option.

CHAPTER 5

STUDY 1 RESULTS

Overall Results of Regression

Means and standard deviations are shown in Table 6. Correlations are Pearson correlation coefficients. Since gender and unhealthy decision are dichotomous variables, the point biserial correlation is figured in this instance. The mode for gender is male (1) with 58.4% of values. The mode for unhealthy decision is less healthy snack selected (1) with 51% of values.

For ease of interpretation, the three DV's were coded so that higher scores meant more unhealthy. For instance, higher BMI means more unhealthy. Higher calories selected means more unhealthy. Additionally, unhealthy decision was dummy coded so 1 meant less healthy snack selected and 0 meant a healthier snack selected.

Regression was used to test the effect of impulsivity and emotional intelligence on unhealthy eating behaviors. Gender was entered in step 1 as a control variable with its respective beta value and significance level shown as Model 1 in Table 7. Gender values were coded as 1 for males and 0 for females. Following this, restraint, emotional intelligence, and impulsivity were entered in step 2. Their betas and significance levels are reported as Model 2. Finally, the three interactions RESIMP (restraint*impulsivity), RESEI (restraint*emotional intelligence), and IMPEI (impulsivity*emotional intelligence) were entered in step 3 (Model 3). In all cases, moderation was tested by modeling a product term (RESIMP, RESEI, or IMPEI) (Irwin and McClelland, 2001).

Table 6. Study 1 Descriptive Statistics and correlations

Pearson Correlation Matrix											
	Mean	Standard Deviation	Gender***	Restraint Scale	Dutch Eating Behavior Questionnaire (DEBQ)	Eating Inventory	Impulsivity	Consumer Emotional Intelligence Scale (CEIS)	Body Mass Index	Daily Caloric Intake	Unhealthy Decision***
Gender***	0.58	-	1.00	-0.09	-.21**	-.16*	-0.06	-.125*	.226**	0.07	0.06
Restraint Scale	13.55	5.50	-0.09	1.00	.63**	.47**	.134*	0.03	.411**	-.134*	-0.02
Dutch Eating Behavior Questionnaire (DEBQ)	2.61	0.78	-.21**	.63**	1.00	.52**	0.04	0.40	0.00	-.16*	-0.09
Eating Inventory	40.63	7.59	-.16*	.47**	.52**	1.00	.29**	-0.04	0.00	0.03	0.04
Impulsivity	64.77	9.36	-0.06	.134*	0.04	.29**	1.00	-.211**	0.00	0.08	0.10
Consumer Emotional Intelligence Scale (CEIS)	101.15	14.56	-.125*	0.03	0.40	-0.04	-.211**	1.00	0.11	0.03	-0.08
Body Mass Index	24.03	4.82	.226**	.411**	0.00	0.00	0.00	0.11	1.00	-0.07	-0.03
Daily Caloric Intake	2850.33	1580.85	0.07	-.134*	-.16*	0.03	0.08	0.03	-0.07	1.00	0.05
Unhealthy Decision***	0.51	-	0.06	-0.02	-0.09	0.04	0.10	-0.08	-0.03	0.05	1.00

* p < .05

** p < .01

***Gender and Unhealthy decision illustrate the point biserial correlation.

Table 7. Study 1 Regression Results

	Body Mass Index (BMI)						Daily Caloric Intake						Unhealthy Decision (snack selection)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.
Gender	2.21***	0.00	2.70***	0.00	2.75***	0.00	129.72	0.54	118.57	0.58	63.97	0.76	0.06	0.35	0.05	0.44	0.05	0.47
Restraint			0.40***	0.00	0.76	0.12			-56.98***	0.00	129.53	0.44			-0.003	0.65	-0.02	0.78
EI			0.03*	0.10	-0.19	0.20			7.42	0.32	138.78**	0.01			-0.003	0.18	0.01	0.73
Impulsivity			-0.01	0.66	-0.15	0.36			20.76*	0.07	113.05**	0.05			0.01	0.21	0.01	0.62
Restraint*Impulsivity					-0.01	0.28					-0.02	0.99					0.00	0.69
Restraint*EI					0.01	0.86					-26.06**	0.03					-0.001	0.87
Impulsivity*EI					0.03	0.14					-11.79*	0.07					-0.001	0.62
R ²	0.05		0.25		0.26		0.00		0.05		0.09		0.00		0.02		0.03	
Adj R ²	0.05		0.23		0.23		0.00		0.03		0.06		0.00		0.01		-0.01	
F	11.59***	0.00	18.15***	0.00	10.90***	0.00	0.38	0.54	2.85**	0.03	3.02***	0.01	0.89	0.35	1.34	0.26	0.82	0.57
Δ F	11.59***	0.00	19.40***	0.00	1.17	0.32	0.38	0.54	3.67***	0.01	3.15**	0.03	0.89	0.35	1.48	0.22	0.16	0.92
Δ R ²	0.05		0.20		0.01		0.00		0.05		0.04		0.00		0.02		0.00	

*** p < .01

** p < .05

* p < .1

EI = Emotional Intelligence

**** Logistic regression was used to test these relationships and did not change the results.

***** Calories was the unit of measurement for daily caloric intake.

As shown in Table 7, gender had a significant positive effect on BMI, both independently and in the presence of restraint, EI, and impulsivity. These results suggest males have higher BMI ($\beta = 2.70$, $p < .01$).

The addition of restraint, emotional intelligence, and impulsivity significantly added to the variance explained for BMI and daily caloric value. The statistically significant amount of additional variance explained by restraint, emotional intelligence, and impulsivity, over and above that explained by gender, was 20% for BMI. For the daily caloric value dependent variable, the addition of the interaction terms added 4% of additional variance explained to model 3.

For BMI, an F test confirms model 2 is the best fit ($F = 18.15$, $df = 4$, 223, $p < .01$). Therefore, I examined main effects in this model and interaction hypotheses (1 and 3) are not supported. For daily caloric value, an F test indicates model 3 is better than model 2 ($F = 3.02$, $df = 7$, 225, $p < .01$). Therefore, my interaction hypotheses are tested using model 3 for DCI.

All restraint scales were investigated (see results in Appendix C). For the first dependent variable, an F test shows BMI should be evaluated at the model 2 level, meaning no interaction effects should be investigated for restraint ($F = 18.15$, $df = 4$, 223, $p < .01$; DEBQ ($F = 4.73$, $df = 7$, 219, $p < .01$); Eating Inventory ($F = 3.87$, $df = 4$, 219, $p < .01$). All models with BMI as the dependent variable showed significant effects for gender (restraint: $\beta = 2.70$, $p < .01$; DEBQ: $\beta = 2.98$, $p < .01$; Eating Inventory: $\beta = 2.42$, $p < .01$) and Emotional Intelligence (restraint: $\beta = .03$, $p < .10$; DEBQ: $\beta = .05$, $p < .05$; Eating Inventory: $\beta = .04$, $p < .10$). The only difference was the model using the Eating Inventory restraint measure did not find an effect of restraint on BMI.

For the daily caloric intake dependent variable, F tests indicated interaction effects should be examined in model 3 for restraint and DEBQ (restraint: $F = 3.02$, $df = 7$, 225, $p < .01$; DEBQ: $F = 2.89$, $df = 7$, 224, $p < .01$). In all three restraint scale models, EI (restraint: $\beta = 138.78$, $p < .01$; DEBQ: $\beta = 152.51$, $p < .01$; Eating Inventory: $\beta = 116.75$, $p < .05$), impulsivity (restraint: $\beta = 113.05$, $p < .05$; DEBQ: $\beta = 162.18$, $p < .01$; Eating Inventory: $\beta = 140.00$, $p < .10$), and the impulsivity * EI interaction (restraint: $\beta = -11.79$, $p < .10$; DEBQ: $\beta = -15.81$, $p < .05$; Eating Inventory: $\beta = -11.81$, $p < .10$) were all significant. Additionally, in the restraint scale model, the restraint * EI interaction ($\beta = -26.06$, $p < .05$) was also significant.

Hypothesis 1. No support was found for hypothesis 1. The data in Table 7, model 2, shows that restraint increases BMI ($\beta = .40$, $p < .00$), but impulsivity does not moderate the relationship between restraint and unhealthy eating behaviors (measured by the RESIMP interaction). Moreover, in Table 7, RESIMP does not yield significant findings for BMI ($\beta = -.01$, $p < .28$), DCI ($\beta = -.02$, $p < .99$), or unhealthy decision ($\beta = .00$, $p < .70$).

Hypothesis 2. Significant positive relationships were found for emotional intelligence, but run contrary to the anticipated negative direction in hypothesis 2. Results show emotional intelligence increases BMI marginally ($\beta = .03$, $p < .10$) in Table 7, model 2. Furthermore, emotional intelligence increases daily caloric value ($\beta = 138.78$, $p < .01$) in Table 7, model 3.

Hypothesis 3. Hypothesis 3 received partial support for the daily caloric intake dependent variable in Table 7, model 3. With restraint at its mean, EI negatively moderates the relationship between impulsivity and daily caloric intake ($\beta = -11.79$, $p < .07$). Impulsive individuals chose more calories ($\beta = 113.05$, $p < .05$). Lastly, with impulsivity at its mean, EI negatively moderates the relationship between restraint and daily caloric intake ($\beta = -26.06$, $p < .03$).

A simple slopes analysis (i.e. the slopes at the mean, one standard deviation above and below the mean; Aiken and West, 1991) was conducted in which the impulsivity * EI interaction was regressed onto daily calorie intake. The regression accounted for 3% of the variation in total calories. Results reveal a significant interaction between impulsivity and EI ($\beta = -1.6$, $p < .05$), which supports hypothesis 3.

A simple slopes analysis was also conducted in which the restraint * EI interaction was regressed onto daily caloric intake. The regression accounted for 4% of the variation in total calories. Results reveal a significant interaction between restraint and EI ($\beta = -2.84$, $p < .03$), which also supports hypothesis 3. Please see Appendix D for the corresponding simple slopes analysis results and graphs.

Discussion

Gender and restraint play an important role in an individual's BMI, but not their daily caloric intake or snack selection. Males exhibit higher BMI than their female counterparts. Restrained eaters generally have higher BMI, but restraint does not lend explanatory power to DCI. I expected restrained individuals to have higher BMI due to their chronic dieting and bingeing, which is all captured in the BMI variable. However, I

also expected restrained individuals to select significantly fewer calories in the DCI exercise since they are trying to select foods that will keep them from surpassing their diet boundary.

Across all three dependent variables, BMI consistently showed no moderating influences (the F test was highest for model 2) and a higher R^2 , implying I have more of the important variables incorporated in the model. The daily caloric intake models had a very small effect size. Further, some interaction effects are significant, implying a more complicated relationship between the independent variables and DCI.

Impulsive individuals selected significantly more calories. However, despite some evidence in previous research (Jansen et al., 2009), impulsivity did not moderate the relationship between restraint and unhealthy eating behaviors. Jansen et al. (2009) found high restrained eaters only overeat when they're also impulsive. As cited by Guerrieri and colleagues (2008), this study did not measure actual food intake, so it is difficult to assert impulsive individuals have a harder time resisting food. However, impulsivity is important in predicting daily caloric intake.

Emotional intelligence is weakly associated with an increase in BMI. Wong (2011) found the understanding EI subscale was positively associated with BMI. One possible explanation is that even though an individual has high ability to understand their emotions, it does not necessarily mean they can harness that understanding to improve their eating behavior. Further, if the four EI dimensions have differing effects, they may be canceling each other out in this data, resulting in few significant relationships. Since the EI measure was not reliable at the dimension level, the relationship between the EI dimensions and BMI was not explored here.

Emotional intelligence had a significant effect on both BMI and DCI in all three restraint measure models (restraint scale, eating inventory, DEBQ), indicating it definitely plays a role in an individual's eating decisions. In contrast to some prior research (Kidwell, Hardesty and Childers, 2008a), in all models, higher emotional intelligence was associated with higher BMI scores and a higher number of calories chosen (DCI). Even though EI had a significant impact on the eating behavior, it produced a small effect size, indicating EI may not play as important of a role in restrained eater's behavior as originally theorized. Another possible explanation for this is the author used an ability-based measure of emotional intelligence as opposed to a trait-based EI measure. Swami, Begum, and Petrides (2010) claim there is no conceptual reason why an individual's attitude about their body should be related to ability-based emotional intelligence. Trait emotional intelligence is defined as "people's self-perceptions of their emotional abilities" (Swami et al., 2010, p. 486). A few studies have indicated that trait EI is significantly related to disordered eating attitudes (Costarelli, Demerzi, and Stamou, 2009; Markey and Vander Wal, 2007).

In this study, I evaluated the proposed models using all 3 restraint measures (Restraint scale, Eating Inventory, DEBQ). As indicated earlier in Chapter 4, the three restraint measures were highly correlated in this sample and found to have a high degree of convergent validity. Moreover, as expected, for each dependent variable we saw very similar effects regardless of which measure of restraint we use.

CHAPTER 6

STUDY 2 METHOD

The objective of study two is to determine if restrained eaters look longer at calorie information (hypothesis 4) than unrestrained eaters. The first study used the self-report method to investigate if the individual noticed and/or utilized the caloric information. The next hypothesis uses the eye tracker as an alternate way of assessing attention. It tracks where the respondent looks and for how long. I used a laboratory experiment to empirically test this hypothesis.

Sample

College students from a large Midwestern university were invited to participate in a pre-screener questionnaire consisting of the restraint scale. The participant could not have participated in study 1 or 3. Thirty randomly selected restrained participants, defined as a score of 15 or above on this scale, were invited to participate in the study. Thirty randomly selected unrestrained participants, defined as a score of 14 or below on the scale, were also invited to participate in this study. If a participant was invited and declined, I then invited the next randomly selected restrained/unrestrained participant. In total, 70 participants were recruited, but fourteen were either eliminated for incomplete survey response data or did not attend their appointment, resulting in 30 restrained and 26 unrestrained participants.

Measures

Three of the same measures included in study one were also included in the study two questionnaire; the Emotional Intelligence scale, Barratt Impulsivity scale, and Restraint scale. Restrained eaters were again defined as those scoring a 15 or more on the restraint scale. The restraint scale, concern for dieting dimension, was reliable with a Cronbach's alpha of .80. The restraint scale, weight fluctuation dimension, was reliable with a Cronbach's alpha of .71. The reliability of the linear combination for the restraint scale is .84. Motor impulsivity had an alpha of .66. Non-planning impulsivity was reliable with an alpha of .73. Attentional impulsivity had an alpha of .68. The reliability of the linear combination for the impulsivity scale was .73. The revised nine item EI scale had a Cronbach's alpha of .59.

The dependent measure in this study was dwell time. Dwell time is captured in milliseconds (ms) and is defined as starting “at the moment the area of interest (AOI) is fixated and ends at the moment the last fixation on the AOI ends for each visit of the AOI. It is therefore the sum of durations from all fixations and saccades that hit the AOI.” (SensoMotoric Instruments, 2013, p. 243) Saccades are defined as “rapid eye movements the eye makes while jumping from point to point in the stimulus.” (SensoMotoric Instruments, 2013, p. 16) Dwell time is used here as a proxy for the level of interest an individual has in what they're attending to.

Mogg and associates (2005) found dwell time to be a useful in measuring attention to important stimuli. Numerous researchers have used dwell time to measure attention in eye tracking research. Van Herpen and Van Trijp (2011) used dwell time (regular, average and summed) to investigate how long nutrition labels were attended to

through eye tracking. Further, Graham and Jeffrey (2011) examined how long people inspected nutritional information on shopping screens. Additionally, Werthmann and colleagues (2011) used dwell time (average) on food and non-food images for different consumer groups (overweight vs healthy weight participants).

“The area of interest (AOI) is a zone of the stimulus that an experimenter is interested in analyzing (SensoMotoric Instruments, 2013, p. 20).” The AOI is defined by the experimenter using a free hand rectangular tool in the BeGaze software. To ensure a conservative estimate of eye tracking data, I drew the AOI to only include the immediate calorie information area. The calorie (red) and price (orange) AOI’s are shown in Appendix F.

Materials

A menu similar to the one in study one was used; however, I added a column for price and pictures of a logo to this menu to give the individual more information to look at besides just calories. As explained in the next section, the breakfast, lunch and dinner menus were split into different screens due to the entire menu being too long to fit on a page.

Procedure

Participants were asked to report to a laboratory for an experiment regarding food decision-making. They were asked to sit in front of an eye tracker. An iView X RED (remote eye-tracking device) system was used. This eye tracker system is remote, non-

invasive, and ideal for tracking eye movements on a computer screen in a laboratory setting. The sampling rate used was 60 Hz.

The experimental manipulation screens are outlined in Appendix G. First, the eye tracker was calibrated. Participants who did not achieve .60 or less on the calibration were given the calibration screen again until they achieved this objective. Next, I displayed a series of menus with the item, the price, and the number of calories. The participant was shown a breakfast food menu and then asked to make their food selection on the next screen with a mouse. Then they were shown a breakfast beverage menu and asked to make their beverage selection on the next screen. The same process was used for breakfast, lunch and dinner. During this manipulation, I collected eye tracker data concerning where the participant looked (item description, price, or calorie content) and how long they focused on this information.

After the participant made their food selections for all meals, they were asked to complete an online questionnaire on a different computer. The questionnaire included measures on restrained eating, emotional intelligence, and impulsivity.

CHAPTER 7

STUDY 2 RESULTS

Results

Hierarchical regression was used to test the effect of restraint on dwell time. Gender was entered in step 1 as a control variable. Following this, restraint score was entered in step 2. Beta values and significance levels are shown in Table 8.

Unrestrained scores ranged from 2 to 14 with a mean of 8.8. Restrained scores ranged from 15 to 29 and averaged 19.5. A t-test shows the means are significantly different ($p < .000$). Dwell time had a minimum of 0 and maximum of 18,249 milliseconds. The mean was 2,431 milliseconds, median was 1,308 milliseconds, and standard deviation was 3,041 milliseconds. In regards to dwell time, respondents spent 9% of their time looking at the calorie AOI, 20% looking at the price AOI, and the rest of their time (71%) looking at the area defined as ‘white space’, which is the rest of the menu outside of the calorie and price AOI’s.

The Pearson correlation between restraint and dwell time is .35 ($p < .01$). The Pearson correlation between EI and dwell time is .07. The Pearson correlation between restraint and impulsivity is .22 ($p < .01$).

Hypothesis 4 states that restrained eaters will spend longer evaluating calorie information than unrestrained eaters. In support of hypothesis 4, restraint score had a significant impact on dwell time. Results show more restrained eaters dwelled on calorie information significantly longer ($\beta = .35$, $p < .001$) than less restrained eaters in Table 8, model 2. Moreover, 15% of additional variance was explained beyond gender by adding

restraint score to the model. The interaction of gender and restraint was tested for, but not significant.

As shown in Appendix H, gender had a significant positive effect on BMI, both independently and in the presence of restraint, EI, and impulsivity. The results in model 2 suggest males have higher BMI ($\beta = .25, p < .001$). Gender also had a positive significant effect on the number of calories the participant chose to eat for their meals in model 1 ($\beta = .17, p < .03$). This indicates that male participants selected more calories than female participants.

For both BMI and dwell time, an F test confirms model 2 is the best fit (BMI: $F = 9.18, df = 4, 163, p = .000$; Dwell time: $F = 6.99, df = 4, 163, p = .000$). Therefore, I examined main effects in this model and the interactions are not supported.

For the BMI dependent variable, the data in Appendix H, model 2, shows that restraint increases BMI ($\beta = .33, p < .001$). Additionally, results show higher emotional intelligence increases BMI ($\beta = .17, p < .02$). Both of these results were also found in study 1.

For the dwell time dependent variable, more restraint was associated with higher dwell time ($\beta = .35, p = .000$), which lends confirmation to hypothesis 4. This relationship is illustrated in table 8, model 2.

Table 8. Study 2 Regression Results

	Dwell Time (ms)					
	Model 1		Model 2		Model 3	
	b	Sig.	b	Sig.	b	Sig.
Gender	0.02	0.77	0.09	0.22	0.09	0.25
Restraint			0.35***	0.00	0.33***	0.00
EI			0.07	0.34	0.09	0.27
Impulsivity			0.10	0.20	0.02	0.86
Restraint*Impulsivity					0.12	0.44
Restraint*EI					-0.02	0.86
Impulsivity*EI					-0.12	0.28
R²	0.00		0.15		0.15	
Adj R²	-0.01		0.13		0.12	
F	0.09	0.77	6.99***	0.00	4.16***	0.00
△ F	0.09	0.77	9.29***	0.00	0.48	0.70
△ R²	0.00		0.15		0.01	

*** p < .01

** p < .05

* p < .1

EI = Emotional Intelligence

Discussion

Polivy (1996) cited restrained eaters as having more focus on food-related information than unrestrained eaters. Further, Cranage et al. (2005) found restrained eaters made healthier decisions when calorie information was present. Unrestrained eaters are expected to eat until they're full, as opposed to dieting and counting calories. This study lends support to the notion restrained eaters are more focused on nutritional information than unrestrained eaters. When presented with a menu with calorie information, restrained eaters looked significantly longer at the calorie information than their unrestrained counterparts.

This study also lends support to research using eye tracking to gauge consumer's attention to nutrition fact labeling. Visschers, Hess and Siegrist (2010) cited a majority of participants (66%) perceived the nutrition information presented. Additionally, those with a health motivation had a longer mean gaze duration than those with no health motive.

I provide an important contribution to the literature as one of the first studies examining consumer attention to menu calorie labeling in an eye tracking context. With recent legislation passed mandating chain restaurants to post calorie information on their menus, this is an important topic from a public policy perspective. Researchers need to determine if this legislation has any chance of accomplishing the goal of influencing consumers to make healthier food decisions.

CHAPTER 8

STUDY 3 METHOD

The objective of study three is to determine if a mindfulness intervention will influence restrained eaters to make healthier (more mindful) eating decisions (hypothesis 5).

Participants were analyzed according to their restrained eating status (restrained vs. unrestrained). Restrained versus unrestrained eaters were classified into each category according to their responses on the restraint scale (Herman and Polivy, 1980). As in study two, an individual scoring 15 or above was considered a restrained eater. The experimental design is a 2 (restrained/unrestrained) * 2 (mindfulness intervention/no training) between subjects ANOVA.

The dependent variable used was calories consumed (judged by the participant's three-day food diary). The experimenter calculated calorie content on a daily basis (day 1, 2 and 3). The analysis includes these 3 days of calories separately, as well as in conjunction with each other. Calories were determined by consulting www.calorieking.com based on the food and portion size consumed. An example of the food diary appears in Appendix L.

The survey contained the same measure of restraint as in the previous two studies. The Cronbach's alpha for restraint, concern for dieting, was .63. The Cronbach's alpha for restraint, weight fluctuation, was .75. The reliability of the linear combination of restraint was .78. The mindful eating class independent variable was based on whether or not the participant was asked to attend the mindful eating class sessions or not.

Materials

Survey responses were collected to investigate the individual differences of the participant's involved. The mindfulness training workshops were developed in conjunction with a local expert who led the workshop. The experimenter and mindful eating class facilitator worked together to determine the class schedule (Appendix I) based on the literature and the facilitator's experience. Training materials were developed and then utilized during the class 'practices' and out of class 'homework' (Appendix K). Before moving on to the procedure, I will outline additional details concerning how the training materials were developed.

In Chapter 3, I outlined the four components of MB-EAT. As a reminder, they are: 1) cultivating mindfulness, 2) cultivating mindful eating, 3) cultivating emotional balance, and 4) cultivating self-acceptance (Kristeller and Wolever, 2011). Next, I specifically discuss how class materials incorporate these components.

Cultivating mindfulness.

The principle of cultivating mindfulness focuses on cultivating the capacity to direct attention and be aware. Non-judgmental awareness means the individual should accept whatever comes to mind by observing it instead of judging it (Alberts et al., 2010).

Awareness was fostered in this training with the first out of class homework, "Daily Mindfulness." In this handout, the participant was asked to recognize bodily sensations and daily activities while remembering to breathe. When an individual becomes aware of food related thoughts and does not act upon them, they will learn that the thoughts will soon fade. Additionally, the mini-meditation homework in session 2, 3-

minute breathing space, and mindful eating summary tips are all an example of this component. The mini-meditation and breathing space exercises are activities to bring quiet and focus the participant's attention.

Cultivating Mindful Eating.

When an individual experiences food cravings, they are taught to be aware of and accept these bodily sensations without acting upon them (Alberts et al., 2010). In accordance with mindfulness-based eating awareness training (Kristeller, Baer, and Wolever, 2006), a number of meditations involving foods were incorporated into this training, such as the raisin exercise (session 1), eating cheese and crackers (session 2), and the Hershey's kiss exercise (session 3). The practice of these eating-related meditations has been found to improve self-regulation (Kristeller, Baer, and Wolever, 2006). The raisin exercise was borrowed from mindfulness-based stress reduction trainings (MBSR) (Kristeller and Wolever, 2011). The foods are designed to become increasingly challenging, as judged by higher caloric and hedonic value (Kristeller and Wolever, 2011).

Additionally, the "Principles of mindful eating" handout and "Mindful eating summary tips" also incorporate the mindful eating component. These handouts outline important mindful eating concepts and give participants tips on how to eat mindfully. One of these concepts is awareness and cultivation of the fullness experience. The hunger/satiety scale is an example of this component. It is an exercise to point out to individuals when they are full. Recognizing mindless eating is an important part of this, which is addressed through the homework of eating one snack per day mindfully and the

taste and satiety meditation. Finally, in this component we work to foster awareness of where our hunger is coming from so we can satisfy it. In the “Seven Kinds of Hunger” handout, we work to recognize which of our senses are hungry.

Cultivating Emotional Balance.

MB-EAT draws awareness to an individual’s emotions and emotional reactivity. The purpose of this is to learn to identify emotional triggers that may lead to binges. In session 2, Sarah spoke to participants about hunger cues and triggers of binge eating. We also worked on binge recovery in session 4. Further, the “Seven kinds of hunger” handout addresses this principle, specifically as it relates to “mind hunger” and “heart hunger.” Part of this component involves savoring food, so we can still eat foods we like in smaller portions with a focus on quality. The previously mentioned food exercises we did focus on savoring.

Cultivating Self-acceptance.

Cultivating self-acceptance emphasizes acceptance of self and others, non-judgment of one’s body, and recognizing anger at self and others (Kristeller and Wolever, 2011). In accordance with this principle, mindful body work was incorporated into the training sessions to foster acceptance of the body without judging it (Kristeller and Wolever, 2011). The body scan is an important component and is performed by directing one’s attention to different body parts, starting at the toes and moving up to the head. The technique helps increase an individual’s body awareness (Alberts et al., 2010). Participants were asked to do a body scan in three of the four training classes, illustrated

in Appendix I. A full scan was performed in sessions 1 and 3 and a mini-body scan in session 2 (the 3 minute breathing space from Appendix K). Full body scans took about 15 minutes to complete. The “Loving Kindness and Self-compassion meditation” is a method directed at recognizing anger and accepting it (Kristeller and Wolever, 2011). In this exercise, Sarah asked participants to fill their hands with loving kindness and direct it first towards the body parts they like, before moving on to body parts they don’t care for.

Procedure

The experimenter attempted to recruit 48 participants from undergraduate marketing classes to participate. The participants were offered extra credit for their participation in the survey, and \$5 per class attended if they were randomly selected to participate in the mindful eating training. First, they were sent a questionnaire containing the restrained eating measure. Based on their responses, they were separated into restrained vs. unrestrained eaters. Twelve restrained individuals and twelve unrestrained individuals were invited to participate in mindfulness meditation training. A staff psychologist from Iowa State University, Sarah Anthoney, with extensive experience leading mindfulness meditation classes, taught participants important mindful eating techniques. The mindfulness training was conducted for one hour, two times per week for a period of two weeks. Between training sessions, participants were asked to complete short homework exercises to ensure they were practicing the techniques they learned in the training sessions.

The mindful eating training had low participation after the first week (only 8 of the 24 invited attended). Eight participants who were initially selected participated in the

mindful eating classes. Two of the eight were dropped in the final sample as they didn't complete the food diary. Four participants were unrestrained with a mean score of 11, and two were restrained with a mean restraint score of 21. A one-sample t-test was not significant for the group initially selected, $t(5) = 1.58$ ($p = .175$).

To remedy this, the experimenter went into marketing classes the next week and recruited people to attend. The additional participants recruited first completed the questionnaire (just as the original participants) and then were invited to the last two sessions. The final training group consisted of 11 restrained and 24 unrestrained eaters. The mean restraint score for the restrained eaters was 18, while the mean restraint score for the unrestrained eaters was 10. A one-sample t-test was also calculated for the final mindful training group, $t(34) = 16.59$ ($p = .000$). The final group that did not participate in mindful eating training included 12 restrained and 23 unrestrained participants. In sum, Table 9 below shows the breakdown of how much training each participant received.

Table 9. Study 3 Number of participants and number of hours of training received

Restraint score	Number of training classes attended					Grand Total
	1	2	3	4	No training	
3					1	1
4					3	3
5					1	1
6	2				1	3
7	1	2			4	7
8		1			2	3
9	1	1			1	3
10	2	2	1	1	2	8
11		2			3	5
12		2	1		2	5
13	1	1	1		1	4
14	2				2	4
15	2				2	4
16	1				1	2
17	2	1			1	4
18					2	2
19					2	2
20		2				2
21			1	1	2	4
22	1				2	3
Grand Total	15	14	4	2	35	70

Number of training classes attended	Restrained	Unrestrained	Grand Total
1	6	9	15
2	3	11	14
3	1	3	4
4	1	1	2
No training	12	23	35
Grand Total	23	47	70

All study participants were then asked to keep a food diary (see Appendix L) for a three day period following the training. The training ended on Wednesday, November 20th, 2013. All participants were asked to complete a food diary for Thursday, November 21st (day 1), Friday, November 22nd (day 2), and Monday, November 25th (day 3). The weekend was intentionally avoided due to college students' abnormal eating patterns on the weekend.

Research has shown three to seven days to be the optimal time frame upon which to ask participants to record a food diary (De Castro, 2000; Thompson and Byers, 1994). Anything over seven days causes participant fatigue, resulting in unreliable estimates (Thompson and Byers, 1994). Participants were asked to record the following information: 1) name of food (and brand if possible), 2) preparation method, and 3) portion size. Participants who did not undergo the mindfulness meditation training were also asked to keep a food diary for the same period of time.

CHAPTER 9

STUDY 3 RESULTS

Results

A two-way ANOVA was conducted that examined the effects of restraint (restrained/unrestrained) and mindful eating class (mindful eating class/no class) on calories chosen. Table 10 reflects descriptive statistics, Table 11 a means table, and Table 12 illustrates ANOVA results. Levene's test indicated unequal variances for day 2 calories ($F=3.49$, $p=.02$).

Hypothesis 5 stated that a mindfulness intervention will influence restrained eaters to make healthier eating decisions. This hypothesis was tested in the form of an interaction term, restraint * mindful eating class. In table 12, the third line for the dependent variable (sum of day 1-3 calories), which is labeled restraint * mindful eating class, indicates the tests of hypothesis 5. As illustrated, the interaction term is not significant.

A significant main effect of restraint was found, $F(1,66)=4.97$, $p=.03$. Calories consumed was higher for unrestrained eaters ($M=5,392.56$) than for restrained eaters ($M=4,706.57$).

Table 10. Descriptive Statistics

Day 3	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	3354	552	1726	571	1704
Mindful eating class	35	2761	786	1676	464	1552
Unrestrained	37	3354	815	1772	535	1650
Restrained	33	2602	552	1621	491	1538
Day 2	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	3011	720	1735	552	1584
Mindful eating class	35	3492	817	1752	694	1549
Unrestrained	37	3492	817	1900	680	1747
Restrained	33	2934	720	1568	506	1490
Day 1	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	3687	856	1772	643	1746
Mindful eating class	35	2636	565	1475	473	1388
Unrestrained	37	3687	767	1704	637	1497
Restrained	33	2902	565	1534	503	1503
Avgcaloriesdays1to3	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	2686	726	1744	440	1722
Mindful eating class	35	2904	1066	1634	431	1608
Unrestrained	37	2904	1076	1751	458	1727
Restrained	33	2209	726	1563	365	1585
Avgcaloriesdays1and2	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	2829	813	1754	474	1709
Mindful eating class	35	3064	812	1614	502	1617
Unrestrained	37	3064	812	1758	526	1679
Restrained	33	2201	813	1531	373	1495
Avgcaloriesdays1and3	Sample Size	Max	Min	Average	Std Dev	Median
No Class	35	3105	729	1749	493	1737
Mindful eating class	35	2610	676	1576	386	1560
Unrestrained	37	3105	901	1699	473	1696
Restrained	33	2249	676	1588	392	1615

Table 11. Study 3 Means tables

	Restrained		Mindful Eating Training	
Dependent Variable	Restrained	Unrestrained	Training	No Training
Day 1, 2 & 3 Calories (Sum Total)	4,706.57	5,392.56	4,855.91	5,243.22

Items bolded are significant at $p < .05$

Table 12. Study 3 ANOVA results

Variable	Day 1, 2 and 3 Calories		
	MS	F	η^2
Restraint	8,147,013.63	4.97**	0.07
Mindful Eating Class	2,597,009.20	1.59	0.02
Restraint * Mindful Eating Class	12,721.44	0.01	0.00

*** $p < .01$

** $p < .05$

Discussion

Hypothesis 5, which stated that a mindfulness intervention will influence restrained eaters to make healthier eating decisions, was not supported. A main effect of restraint was found, but the interaction effect of restraint * mindful eating class was not significant. These data suggest that restrained eaters reported consuming fewer calories than unrestrained eaters. Restraint does affect the number of calories consumed.

CHAPTER 10

OVERALL DISCUSSION

Mindful eating and menu calorie labeling have both gained widespread popularity as research topics in the last few years. There has been an influx of menu calorie labeling studies recently since the Affordable Care Act was passed. Results have been mixed. Many have found the presence of calories on menus will influence consumers to consume fewer calories (Krieger et al., 2013; Morley et al., 2013; Pang and Hammond, 2013). Other researchers have not found significant differences in calories consumed based solely on whether or not they see the calorie information (Burton et al., 2009; Liu et al., 2012; Roseman et al., 2013).

Study two found the presence of calories on a menu did result in restrained eaters selecting fewer calories than unrestrained eaters. This has important implications for restaurants. Since the Affordable Care Act has been passed, restaurants will soon be forced to put calorie labeling on menus. The legislature hopes this will help curb the obesity epidemic by making people think about what they eat. My study confirms that calorie labeling on menus will indeed help restrained eaters select fewer calories.

Moreover, study two is noteworthy because it looks at this issue from a restrained eater perspective. Further, it uses a different methodology, eye tracking, than has been used previously, to uncover the underlying cognitive process consumers' use when examining the calorie information.

Restrained eaters' consistently reported the consumption of fewer calories than unrestrained eaters throughout all studies. Since they are chronic dieters, they are very

concerned with what they are eating and strive to eat the least amount of food as possible. The binge eating pattern restrained eaters exhibit is difficult to capture in experiments that are based on the participant's reported or desired calorie consumption. Out of the three dependent variables examined in study 1, BMI was subject to the least social desirability bias and was most illustrative of the long-term effects of one's eating pattern because it incorporated bingeing episodes. Future research may be able to expand by observing restrained eaters' behavior unobtrusively for longer periods of time; however, that is somewhat unrealistic due to the amount of resources necessary to do this kind of research.

Two recent literature reviews on the topic of mindful eating reinforce its potential to fight obesity (Godsey, 2013; Keng et al., 2011). Increasingly, studies find positive psychological benefits to engaging in mindfulness based eating trainings. A few benefits cited thus far include a reduction in BMI (Dalen et al., 2010; Tapper et al., 2009), an increase in cognitive restraint toward food attractions (Dalen et al., 2010; Papies et al. 2012), less overeating (Bahl et al., 2012), less skipping meals (Bahl et al., 2012), and fewer food cravings (Alberts et al., 2010; Alberts et al., 2012).

Research in marketing has only skimmed the surface of using mindful eating as a treatment for restrained eating. At the time of this dissertation, only one marketing article has appeared on the topic (Bahl et al., 2012), and it did not go so far as to host a mindfulness intervention. The psychology literature (Alberts et al., 2010; Alberts et al., 2012; Dalen et al., 2010; Papies et al., 2012; Sojcher et al., 2012; Tapper et al., 2009) has clearly established this as a useful treatment mechanism for those with eating issues, and

marketing should follow their lead to investigate this phenomenon from a consumer behavior perspective.

Limitations and Future Research

Restrained Eating. The CEIS did not perform reliably in any of my studies, and two dimensions of impulsivity (motor = .66, attentional = .68) were below the accepted reliability threshold of .7 in study 2 (however, the reliability of the linear probability for impulsivity was acceptable at .73). Additionally, the restraint scale dimensions were reliable at .67 for both dimensions in study 1 (although again the reliability of the linear combination was acceptable at .75).

A student sample was drawn from for all studies in this dissertation for convenience purposes and limits the generalizability of the results to other populations. Further, college students have had less experience grocery shopping for themselves and they also may be more prone to binging. The unhealthy snack selection dependent variable needs to be examined thoroughly before being used in future research, as it indicated very little in this research. A potential reason was there was not enough variance in healthiness between healthy and unhealthy items (for example, regular chips with 160 calories versus baked chips with 120 calories).

Some researchers have found BMI actually drives higher restraint (de Lauzon-Guillain et al., 2006; Shunk and Birch, 2004; Snoek, Van Strien, Janssens, and Engels, 2008; Stice, Mazotti, Krebs, and Martin, 1998), as opposed to restraint driving BMI, as was tested in this research. Future research should investigate this possibility.

Menu Calorie Labeling. Similarly to other research using eye tracking methodology, the sample size must remain small due to resource constraints. Additionally, the study was conducted in a laboratory setting, offering great control over procedures but limiting the study to an unrealistic menu ordering context where the participant makes their food selection on the computer screen, as opposed to verbally conveying their order to wait staff. As was the case in study one, a sample made up of entirely college students limit the generalizability of the findings.

This topic has only begun to be explored. Much potential for future research exists. First, the healthiness of the participant's decision should be examined immediately to determine if longer examination of the calorie information actually influenced the restrained eater to make healthier decisions. It would also be interesting to understand what other individual differences (besides restraint status) influence consumers to pay attention to and utilize calorie information.

Since there have been mixed findings concerning the impact of menu calorie labeling, some have suggested there are likely other variables that affect what consumers do with calorie information (Maher, Boles, Moore, and Knapp, 2010). Future research should continue to explore this possibility. Future research should also examine the use of menu signposting (heart healthy logos and the like) as preliminary findings suggest these pictures may aid consumers in processing nutrition information quickly on restaurant menus (Antunez, Vidal, Sapolski, Gimenez, Maiche, and Ares, 2013; Food Standards Agency, 2004; Jones and Richardson, 2007).

Mindfulness. A few limitations of this research should be noted. First, attendance to the mindful eating class was poor. Student subjects were used. Also, the timing of the food diary could have been better. As previously mentioned, the class ended on a Wednesday, so the food diary days fell over a weekend and day 3 was pushed out to the next week due to that. Additionally the research fell in the Thanksgiving time frame, which also may be illustrative of abnormal eating behavior.

Generally speaking, Godsey's (2013) literature review cited several additional limitations of mindfulness research overall. First, yoga has been used primarily as the mindfulness based treatment mechanism in this literature review. Obviously mindfulness based eating classes, such as MB-EAT and the one conducted in this study, are quite different training mechanisms. Differences in the format of the mindfulness intervention could make a substantial difference in the outcome, and that should be considered in future research. Additionally, future research on mindfulness interventions should examine what makes a mindful eating training effective. For instance, the length, characteristics of instructor, cost, components, etc. should be explored. Finally, future research could examine mindfulness based interventions in combination with an exercise program.

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APPENDIX A

MENU

Appetizers	Calories
Chicken strips	830
Nachos w/ meat or chicken	430
Wings – 5 included	495
Cheese Sticks (fried – 4 pieces)	380
Entrees	
Sandwiches	Calories
Asiago Roast Beef	710
Sierra Turkey	920
Smoked Ham and Swiss	590
Grilled Cheese	870
Single (¼ lb) Cheeseburger	300
Double Cheeseburger	440
Tomato and Cheese Panini	740
Pizzas and Pastas	Calories
Mac and Cheese	980
Lasagna	850
Spaghetti w/meat sauce	710
Pepperoni Pizza	610
Wraps	Calories
Chicken Ranch Wrap	756
Buffalo Chicken Wrap	620
BLT Wrap	751

Salads (large size, dressing included)	Calories
--	----------

Grilled Chicken Caesar	440
------------------------	-----

Chopped Chicken Cobb	580
----------------------	-----

Chef Salad	560
------------	-----

Soup (bowl)	Calories
-------------	----------

Baked Potato	350
--------------	-----

Creamy Tomato w/croutons	380
--------------------------	-----

Chicken Noodle	120
----------------	-----

Chili	396
-------	-----

Sides	Calories
-------	----------

French Fries	380
--------------	-----

Kettle Chips	150
--------------	-----

Apple	80
-------	----

Carrots	30
---------	----

Yogurt Parfait	310
----------------	-----

Desserts	Calories
----------	----------

Blueberry Muffin	440
------------------	-----

Chocolate Chip Cookie	440
-----------------------	-----

Cheesecake	510
------------	-----

Chocolate Cake	506
----------------	-----

Apple Pie	411
-----------	-----

Brownie	132
---------	-----

Beverages	Calories
-----------	----------

Bottled water	0
---------------	---

Soda	0-120
------	-------

Select 1 of the following:

Coke	120
Sprite	120
Diet Coke	0
Tea (black)	0
Lemonade	160
Coffee (Regular or Decaf)	6
Espresso	230
Smoothie	290
Beer (Coors Light/Bud Light)	102
Mixed Drink	96

APPENDIX B

STUDY 1 QUESTIONNAIRE

MENU (Appendix A) located here

Please consult the above menu and select the items you would choose for an average lunch. (Select all that apply) (*Daily Caloric Value DV*)

Please consult the above menu and select the beverage you would choose for an average lunch. (*Daily Caloric Value DV*)

Please answer the following questions to the best of your ability. All answers are anonymous, so you will never be identified based on any information disclosed in this questionnaire. This questionnaire is solely for the purpose of my dissertation research concerning eating behavior.

To what degree do you experience hunger at this moment? (*Ward and Mann, 2000*)
1= Not at all, 7= Extremely hungry

What is your mood level? (*Ward and Mann, 2000*)
1=extremely negative, 7= extremely positive

Skip meals

How many days during the last week (0-7) did you skip meals? (Bahl et al., 2012)

Overeat

How many days during the last week (0-7) did you overeat? (Bahl et al., 2012)

What is your age?

- 18
- 19
- 20
- 21
- 22+

What is your gender?

- Male
- Female

How often do you eat fast food?

Monthly
 Every other week
 Once a week
 2-3 times per week
 4-6 times per week
 Daily

What is your ethnicity?
 African-American
 Caucasian
 Asian-American
 Hispanic
 Other

What is your height? ____ Fill in the blank

What is your weight? ____ Fill in the blank

COMPUTE BMI

*The following questions refer to your normal eating pattern and weight fluctuations.
 Please answer accordingly.*

The Restraint Scale

*Note. Factor structure - CD= Concern for Dieting. WF = Weight Fluctuations.
 Herman and Polivy (1980)*

1. How often are you dieting? Factor CD (Scored 0-4)

Never
 Rarely
 Sometimes
 Often
 Always

2. What is the maximum amount of weight (in pounds) you have ever lost in one month?

WF Scored (0-4)

0-4
 5-9
 10-14
 15-19
 20+

3. What is your maximum weight gain within a week? WF Scored (0-4)

0-1
 1.1- 2
 2.1- 3

3.1- 5

5.1 +

4. In a typical week, how much does your weight fluctuate? WF Scored (0-4)

0-1

1.1- 2

2.1- 3

3.1- 5

5.1 +

5. Would a weight fluctuation of 5 lbs affect the way you live your life? CD Scored (0-3)

Not at all

Slightly

Moderately

Very Much

6. Do you eat sensibly in front of others and splurge alone? CD Scored (0-3)

Never

Rarely

Often

Always

7. Do you give too much time and thought to food? CD Scored (0-3)

Never

Rarely

Often

Always

8. Do you have feelings of guilt after overeating? CD Scored (0-3)

Never

Rarely

Often

Always

9. How conscious are you of what you're eating? CD Scored (0-3)

Not at all

Slightly

Moderately

Extremely

10. How many pounds over your desired weight were you at your maximum weight?

WF

Scored (0-4)

0-1

1-5

6-10

11-20

21+

Three Factor Eating Questionnaire (TFEQ)

Stunkard and Messick (1985)

Uncontrolled 1. When I smell a sizzling steak or juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.

Definitely true

Mostly true

Mostly false

Definitely false

Cog 2. I deliberately take small helpings as a means of controlling my weight.

Definitely true

Mostly true

Mostly false

Definitely false

Emotional eating 3. When I feel anxious, I find myself eating.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 4. Sometimes when I start eating, I just can't seem to stop.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 5. Being with someone who is eating often makes me hungry enough to eat also.

Definitely true

Mostly true

Mostly false

Definitely false

Emotional eating 6. When I feel blue, I often overeat.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 7. When I see a real delicacy, I often get so hungry that I have to eat right away.

Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 8. I get so hungry that my stomach often seems like a bottomless pit.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.
 Definitely true
 Mostly true
 Mostly false
 Definitely false
 Emotional eating 10. When I feel lonely, I console myself by eating.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Cog 11. I consciously hold back at meals in order not to weight gain.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Cog 12. I do not eat some foods because they make me fat.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 13. I am always hungry enough to eat at any time.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 14. How often do you feel hungry?
 Only at meal times
 Sometimes between meals
 Often between meals
 Almost always

Cog 15. How frequently do you avoid “stocking up” on tempting foods?

Almost never
Seldom
Usually
Almost always

Cog 16. How likely are you to consciously eat less than you want?

Unlikely
Slightly likely
Moderately likely
Very likely

Uncontrolled 17. Do you go on eating binges though you are not hungry?

Never
Rarely
Sometimes
At least once a week

Cog 18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself?

*The 1–2 scores were coded 1; 3–4 scores were coded 2;
5–6 scores were coded 3; 7–8 scores were coded 4.*

Dutch Eating Behavior Questionnaire (DEBQ)

Van Strien, Frijters, Van Staveren, Defares, and Deurenberg (1986)

A score for this scale is obtained by dividing the sum of item scores by the total number of items; thus, a high score indicates a high degree of restrained eating.
5 response categories, never, seldom, sometimes, often, and very often
#1 and #6 have a ‘not relevant’ option included

1 When you have put on weight do you eat less than you usually do?

Never
Seldom
Sometimes
Often
Very Often

2 Do you try to eat less at mealtimes than you would like to eat?

3 How often do you refuse food or drink offered because you are concerned about your weight?

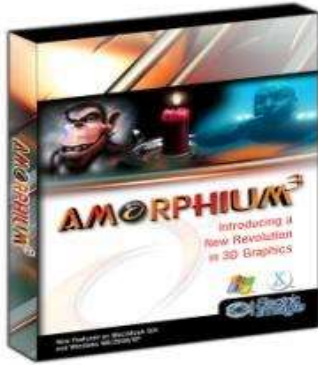
4 Do you watch exactly what you eat?

5 Do you deliberately eat foods that are slimming?

- 6 When you have eaten too much, do you eat less than usual the following day?
- 7 Do you deliberately eat less in order not to become heavier?
- 8 How often do you try not to eat between meals because you are watching your weight?
- 9 How often in the evenings do you try not to eat because you are watching your weight?
- 10 Do you take your weight into account with what you eat?

CONSUMER EMOTIONAL INTELLIGENCE QUESTIONNAIRE

Kidwell, Hardesty, and Childers 2008



Indicate the amount of sadness expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of excitement expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

Indicate the amount of relaxation expressed by the product in this picture. •

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of guilt expressed by the product in this picture.

- a) Not at all present

- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of surprise expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

How useful might it be to feel certain emotions in the following situation?

	Very Useless	Useless	Neutral	Useful	Very Useful
How useful might it be to feel tension when interacting with an aggressive/pushy salesperson when making a purchase?					
How useful might it be to feel hostility when interacting with an aggressive/pushy salesperson at an auto dealership?					
How useful might it be to feel joy when consuming unhealthy food when maintaining a healthy diet?					
How useful might it be to feel frustration when purchasing something expensive and interacting with an incompetent salesperson?					

Joe felt anxious and became stressed when he thought about having to negotiate a price with a car dealer when buying a new car. When the dealer became pushy and began aggressively negotiating the price, Joe then felt ____.

- a) Self-conscious
- b) Depressed
- c) Ashamed
- d) Overwhelmed
- e) Happy

John was in a hurry to eat lunch before an afternoon meeting. When John stopped at a fast food restaurant, he was happy to see that there were healthy food choices on the menu. After reading the nutritional information he was even more pleased about the choice he made, he felt ____.

- a) Depressed
- b) Content
- c) Unsure
- d) Fatigued
- e) Active

A young woman went into a grocery store happy and left the store feeling sad. What happened in between?

- a) she noticed an elderly lady passing out free samples of food
- b) she went to buy her favorite product and it wasn't there
- c) she was buying products that made her feel uncomfortable taking to the cashier
- d) she realized she had a lot of things to do in the afternoon
- e) she was treated rudely by the cashier

A young man was returning expensive clothes. He felt embarrassed and then he felt angry. What happened in between?

- a) he realized that he should not have bought the clothes in the first place
- b) he saw an old friend in the store who was in a hurry and couldn't talk
- c) he decided that he couldn't afford the clothes after all
- d) he was encountered by a salesperson who was suspicious of his intentions
- e) he realized that he lost one of the items he wanted to return

A man watched a TV commercial. He felt sad and then he felt guilty. What happened in between?

- a) the commercial was offensive and made him not want to watch anymore
- b) the commercial was inspiring and made him think about an old relationship
- c) the commercial was thoughtful and made him think about losing touch with an old friend
- d) the commercial was strange and made him think about his years growing up
- e) the commercial was interesting and made him think about a new career path

Debbie just came back from a day of clothes shopping. She was feeling peaceful and content. How well would the following behavior preserve Debbie'sTMs emotions? Behavior: She decides it is best to ignore the feeling since it wouldn't last.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

John went to his favorite clothing store where he saw a shirt that he wanted to buy last week. He felt stressed and frustrated because the shirt that he wanted was no longer there. How well would the following behavior help John reduce his frustration? Behavior: He should discontinue future shopping at that store.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

Becky and Steve want to buy a new car. They will share the car and both have specific preferences in the type of car to be purchased. They have a good relationship but are stubborn about the car that they each want. How effective would Becky be in maintaining a good relationship with Steve if she performed the following behavior? Behavior: She should be sarcastic so that Steve will back down and they buy the car she really wants.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

Sarah has a job in which she interacts with many of her clients. These clients are very important to her and her company since they represent large accounts. She has a great relationship with her clients, although today, one of her clients is very rude and made an offensive comment to her. How effective would Sarah be in maintaining a good relationship with this client if performing the following behavior? Behavior: She should become rude and offensive back to the client.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

I “squirm” at plays or lectures.
I am restless at the theater or lectures.
I don’t “pay attention.”
I concentrate easily.
I am a steady thinker.
I act ‘on impulse.’
I act on the spur of the moment.
I buy things on impulse.
I make up my mind quickly.
I do things without thinking.
I spend or charge more than I earn.
I am happy-go-lucky.
I am a careful thinker.
I plan tasks carefully.
I am self-controlled.
I plan trips well ahead of time.
I plan for job security.
I say things without thinking.
I like to think about complex problems.
I like puzzles.
I save regularly.
I am more interested in the present than the future.
I get easily bored when solving thought problems.
I change residences.
I change jobs.
I am future oriented.
I can only think about one problem at a time.
I often have extraneous thoughts when thinking.
I have ‘racing’ thoughts.
I change hobbies.

APPENDIX C

STUDY 1 REGRESSION RESULTS FOR EATING INVENTORY AND DEBQ MODELS

	Body Mass Index (BMI)						Daily Caloric Intake						Unhealthy Decision (snack selection)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.
Gender	2.21***	0.00	2.42***	0.00	2.34***	0.00	110.59	0.60	162.75	0.45	162.88	0.45	0.05	0.47	0.05	0.45	0.05	0.49
Eating Inventory			0.02	0.69	-0.10	0.79			1.21	0.93	82.86	0.50			0.00	0.67	0.06	0.13
EI			0.04*	0.06	-0.15	0.40			7.84	0.30	116.75**	0.05			0.00	0.36	0.02	0.25
Impulsivity			0.01	0.72	-0.36	0.13			14.26	0.22	140.00*	0.07			0.00	0.35	0.02	0.40
Eating Inventory*Impulsivity					0.00	0.49					-0.86	0.55					0.00	0.42
Eating Inventory*EI					-0.01	0.67					-3.94	0.66					-0.01*	0.10
Impulsivity*EI					0.03	0.12					-11.81*	0.08					0.00	0.87
R ²	0.05		0.07		0.08		0.00		0.01		0.03		0.00		0.02		0.03	
Adj R ²	0.05		0.05		0.05		0.00		-0.01		0.00		0.00		0.00		0.00	
F	11.71***	0.00	3.87**	0.01	2.64**	0.01	0.28	0.60	0.64	0.63	0.94	0.47	0.53	0.47	0.83	0.51	0.94	0.48
Δ F	11.71		1.24		1.00		0.28	0.60	0.76	0.52	1.35	0.26	0.52	0.47	0.93	0.43	1.09	0.36
Δ R ²	0.05		0.02		0.01		0.00		0.01		0.02		0.00		0.02		0.03	

*** p < .01

** p < .05

* p < .1

EI = Emotional Intelligence

	Body Mass Index (BMI)						Daily Caloric Intake						Unhealthy Decision (snack selection)					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.
Gender	2.19***	0.00	2.98***	0.00	2.98***	0.00	111.50	0.60	16.45	0.94	-37.34	0.86	0.07	0.32	0.04	0.57	0.03	0.72
DEBQ			1.62***	0.00	4.35	0.24			-400.27**	0.00	689.89	0.56			-0.07	0.14	0.56	0.14
Emotional Intelligence			0.047**	0.04	-0.15	0.37			5.91	0.43	152.51**	0.01			0.00	0.27	0.03	0.14
Impulsivity			0.01	0.84	-0.21	0.28			19.98*	0.08	162.18**	0.01			0.01*	0.10	0.03*	0.09
DEBQ*Impulsivity					-0.02	0.66					-7.97	0.55					-0.01	0.25
DEBQ*EI					-0.20	0.49					-82.20	0.37					-0.04	0.16
Impulsivity*EI					0.03*	0.10					-15.81**	0.02					0.00	0.33
R ²	0.05		0.12		0.13		0.00		0.05		0.08		0.00		0.03		0.05	
Adj R ²	0.04		0.10		0.10		0.00		0.03		0.05		0.00		0.01		0.02	
F	11.30***	0.00	7.52***	0.00	4.73***	0.00	0.28	0.60	2.98**	0.02	2.89**	0.01	1.00	0.32	1.80	0.13	1.67	0.12
Δ F	11.30***	0.00	6.01***	0.00	1.00	0.39	0.28	0.60	3.87**	0.01	2.68**	0.05	1.00	0.32	2.07*	0.10	1.47	0.22
Δ R ²	0.05		0.07		0.01		0.00		0.05		0.08		0.00		0.03		0.05	

*** p < .01

** p < .05

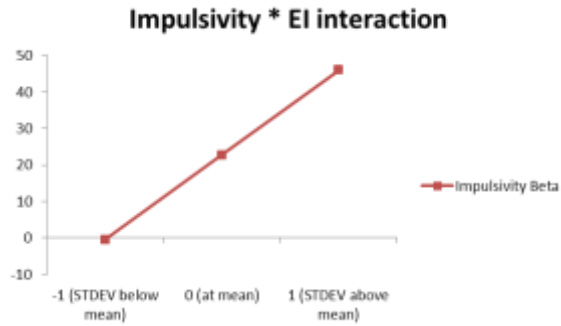
* p < .1

DEBQ = Dutch Eating Behavior Questionnaire

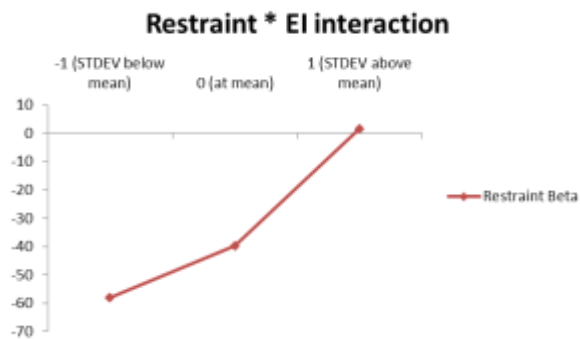
EI = Emotional Intelligence

APPENDIX D

STUDY 1 SIMPLE SLOPES ANALYSIS – INTERACTION EFFECTS FOR DAILY CALORIC INTAKE



NOTE—IMPEI. Betas are unstandardized. At low levels (one standard deviation below) of impulsivity ($\beta = -.54$, $p < .97$). At moderate levels (the mean) of impulsivity ($\beta = 22.73$, $p < .05$). At high levels (one standard deviation above) of impulsivity ($\beta = 46$, $p < .01$).



NOTE—RESEI. Betas are unstandardized. At low levels (one standard deviation below) of restraint ($\beta = -57.97$, $p < .01$). At moderate levels (the mean) of restraint ($\beta = -39.74$, $p < .03$). At high levels (one standard deviation above) of restraint ($\beta = 1.54$, $p < .95$).

APPENDIX E

STUDY 2 QUESTIONNAIRE

Participant Number: Entered by experimenter to match to eye tracking data

Please answer the following questions to the best of your ability. All answers are anonymous, so you will never be identified based on any information disclosed in this questionnaire. This questionnaire is solely for the purpose of my dissertation research.

To what degree do you experience hunger at this moment? (*Ward and Mann, 2000*)

1= Not at all, 7= Extremely hungry

What is your mood level? (*Ward and Mann, 2000*)

1=extremely negative, 7= extremely positive

Skip meals

How many days during the last week (0-7) did you skip meals? (Bahl et al., 2012)

Overeat

How many days during the last week (0-7) did you overeat? (Bahl et al., 2012)

What is your age?

18

19

20

21

22+

What is your gender?

Male

Female

How often do you eat fast food?

Monthly

Every other week

Once a week

2-3 times per week

4-6 times per week

Daily

What is your ethnicity?

African-American

Caucasian

Asian-American

Hispanic

Other

What is your height? ____ Fill in the blank

What is your weight? ____ Fill in the blank

COMPUTE BMI

The Restraint Scale

Note. Factor structure - CD= Concern for Dieting. WF = Weight Fluctuations.

Herman and Polivy (1980)

1. How often are you dieting? Factor CD (Scored 0-4)

Never

Rarely

Sometimes

Often

Always

2. What is the maximum amount of weight (in pounds) you have ever lost in one month?

WF Scored (0-4)

0-4

5-9

10-14

15-19

20+

3. What is your maximum weight gain within a week? WF Scored (0-4)

0-1

1.1- 2

2.1- 3

3.1- 5

5.1 +

4. In a typical week, how much does your weight fluctuate? WF Scored (0-4)

0-1

1.1- 2

2.1- 3

3.1- 5

5.1 +

5. Would a weight fluctuation of 5 lbs affect the way you live your life? CD Scored (0-3)

Not at all

Slightly

Moderately

Very Much

6. Do you eat sensibly in front of others and splurge alone? CD Scored (0-3)

Never

Rarely

Often

Always

7. Do you give too much time and thought to food? CD Scored (0-3)

Never

Rarely

Often

Always

8. Do you have feelings of guilt after overeating? CD Scored (0-3)

Never

Rarely

Often

Always

9. How conscious are you of what you're eating? CD Scored (0-3)

Not at all

Slightly

Moderately

Extremely

10. How many pounds over your desired weight were you at your maximum weight?

WF

Scored (0-4)

0-1

1-5

6-10

11-20

21+

Three Factor Eating Questionnaire (TFEQ)

Stunkard and Messick (1985)

Uncontrolled 1. When I smell a sizzling steak or juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.

Definitely true
 Mostly true
 Mostly false
 Definitely false

Cog 2. I deliberately take small helpings as a means of controlling my weight.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Emotional eating 3. When I feel anxious, I find myself eating.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 4. Sometimes when I start eating, I just can't seem to stop.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 5. Being with someone who is eating often makes me hungry enough to eat also.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Emotional eating 6. When I feel blue, I often overeat.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 7. When I see a real delicacy, I often get so hungry that I have to eat right away.
 Definitely true
 Mostly true
 Mostly false
 Definitely false

Uncontrolled 8. I get so hungry that my stomach often seems like a bottomless pit.
 Definitely true
 Mostly true

Mostly false
Definitely false

Uncontrolled 9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.

Definitely true

Mostly true

Mostly false

Definitely false

Emotional eating 10. When I feel lonely, I console myself by eating.

Definitely true

Mostly true

Mostly false

Definitely false

Cog 11. I consciously hold back at meals in order not to weight gain.

Definitely true

Mostly true

Mostly false

Definitely false

Cog 12. I do not eat some foods because they make me fat.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 13. I am always hungry enough to eat at any time.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 14. How often do you feel hungry?

Only at meal times

Sometimes between meals

Often between meals

Almost always

Cog 15. How frequently do you avoid "stocking up" on tempting foods?

Almost never

Seldom

Usually

Almost always

Cog 16. How likely are you to consciously eat less than you want?

Unlikely
Slightly likely
Moderately likely
Very likely

Uncontrolled 17. Do you go on eating binges though you are not hungry?
Never
Rarely
Sometimes
At least once a week

Cog 18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself?

*The 1–2 scores were coded 1; 3–4 scores were coded 2;
5–6 scores were coded 3; 7–8 scores were coded 4.*

Dutch Eating Behavior Questionnaire (DEBQ)

Van Strien, Frijters, Van Staveren, Defares, and Deurenberg (1986)

A score for this scale is obtained by dividing the sum of item scores by the total number of items; thus, a high score indicates a high degree of restrained eating.

Five response categories, never, seldom, sometimes, often, and very often

#1 and #6 have a ‘not relevant’ option included

- 1 When you have put on weight do you eat less than you usually do
Never
Seldom
Sometimes
Often
Very Often
- 2 Do you try to eat less at mealtimes than you would like to eat?
- 3 How often do you refuse food or drink offered because you are concerned about your weight?
- 4 Do you watch exactly what you eat?
- 5 Do you deliberately eat foods that are slimming?
- 6 When you have eaten too much, do you eat less than usual the following day?
- 7 Do you deliberately eat less in order not to become heavier?
- 8 How often do you try not to eat between meals because you are watching your weight?
- 9 How often in the evenings do you try not to eat because you are watching your weight?
- 10 Do you take your weight into account with what you eat?

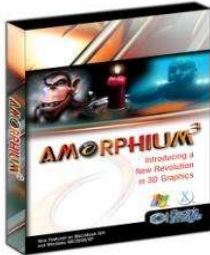
Barrett Impulsivity Scale Version 11 (BIS- 11)

Patton, Stanford, and Barratt, 1995

I “squirm” at plays or lectures.
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 I concentrate easily.
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 I change hobbies.

CONSUMER EMOTIONAL INTELLIGENCE QUESTIONNAIRE

Kidwell, Hardesty, and Childers 2008



Indicate the amount of sadness expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of excitement expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

Indicate the amount of relaxation expressed by the product in this picture. •

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of guilt expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of surprise expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

How useful might it be to feel certain emotions in the following situation?

	Very Useless	Useless	Neutral	Useful	Very Useful
How useful might it be to feel tension when interacting with an aggressive/pushy salesperson when making a purchase?					
How useful might it be to feel hostility when interacting with an aggressive/pushy salesperson at an auto dealership?					
How useful might it be to feel joy when consuming unhealthy food when maintaining a healthy diet?					
How useful might it be to feel frustration when purchasing something expensive and interacting with an incompetent salesperson?					

Joe felt anxious and became stressed when he thought about having to negotiate a price with a car dealer when buying a new car. When the dealer became pushy and began aggressively negotiating the price, Joe then felt ____.

- a) Self-conscious
- b) Depressed
- c) Ashamed
- d) Overwhelmed
- e) Happy

John was in a hurry to eat lunch before an afternoon meeting. When John stopped at a fast food restaurant, he was happy to see that there were healthy food choices on the menu. After reading the nutritional information he was even more pleased about the choice he made, he felt ____.

- a) Depressed
- b) Content
- c) Unsure
- d) Fatigued
- e) Active

A young woman went into a grocery store happy and left the store feeling sad. What happened in between?

- a) she noticed an elderly lady passing out free samples of food
- b) she went to buy her favorite product and it wasn't there
- c) she was buying products that made her feel uncomfortable taking to the cashier
- d) she realized she had a lot of things to do in the afternoon
- e) she was treated rudely by the cashier

A young man was returning expensive clothes. He felt embarrassed and then he felt angry. What happened in between?

- a) he realized that he should not have bought the clothes in the first place
- b) he saw an old friend in the store who was in a hurry and couldn't talk
- c) he decided that he couldn't afford the clothes after all
- d) he was encountered by a salesperson who was suspicious of his intentions
- e) he realized that he lost one of the items he wanted to return

A man watched a TV commercial. He felt sad and then he felt guilty. What happened in between?

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- b) the commercial was inspiring and made him think about an old relationship
- c) the commercial was thoughtful and made him think about losing touch with an old friend
- d) the commercial was strange and made him think about his years growing up
- e) the commercial was interesting and made him think about a new career path

Debbie just came back from a day of clothes shopping. She was feeling peaceful and content. How well would the following behavior preserve Debbie's emotions? Behavior: She decides it is best to ignore the feeling since it wouldn't last.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

John went to his favorite clothing store where he saw a shirt that he wanted to buy last week. He felt stressed and frustrated because the shirt that he wanted was no longer

there. How well would the following behavior help John reduce his frustration? Behavior: He should discontinue future shopping at that store.

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- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

Becky and Steve want to buy a new car. They will share the car and both have specific preferences in the type of car to be purchased. They have a good relationship but are stubborn about the car that they each want. How effective would Becky be in maintaining a good relationship with Steve if she performed the following behavior? Behavior: She should be sarcastic so that Steve will back down and they buy the car she really wants.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

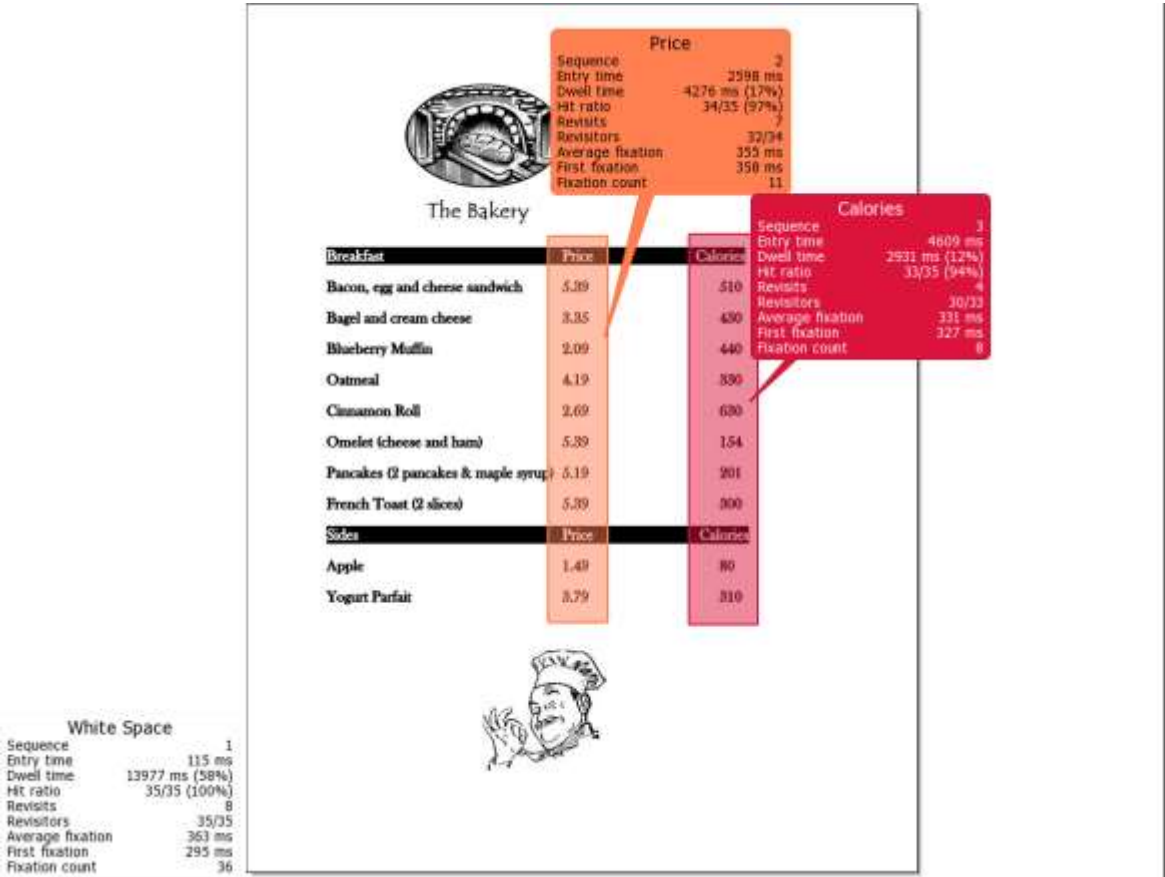
Sarah has a job in which she interacts with many of her clients. These clients are very important to her and her company since they represent large accounts. She has a great relationship with her clients, although today, one of her clients is very rude and made an offensive comment to her. How effective would Sarah be in maintaining a good relationship with this client if performing the following behavior? Behavior: She should become rude and offensive back to the client.

- a) Very Ineffective
- b) Ineffective
- c) Neither Effective nor Ineffective
- d) Effective
- e) Very Effective

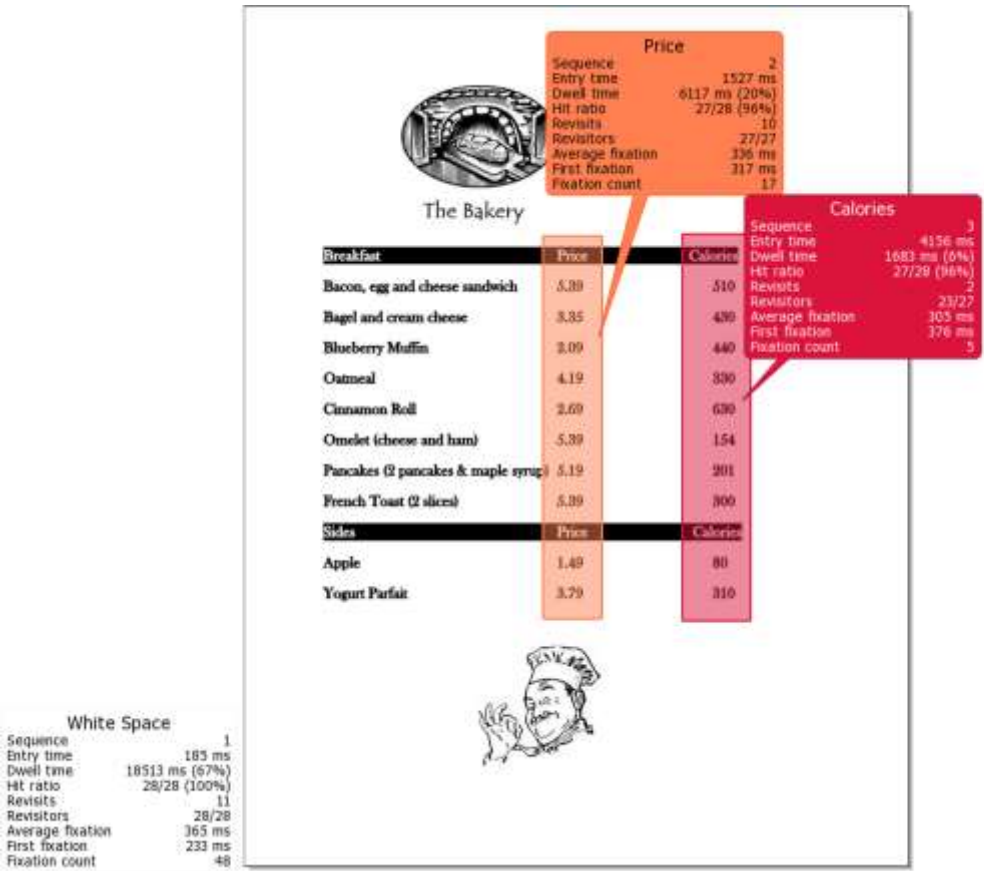
APPENDIX F

STUDY 2 EYE TRACKER KEY PERFORMANCE INDICATORS

Restrained eater breakfast menu key performance indicators

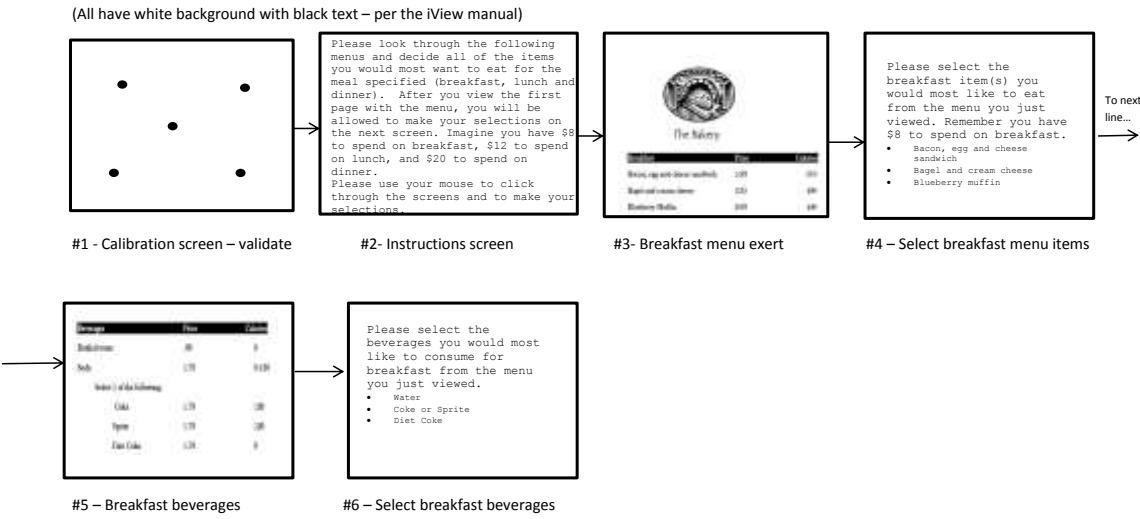


Unrestrained eater breakfast menu key performance indicators



APPENDIX G

STUDY 2 EXPERIMENTAL MANIPULATION



**Example shown for breakfast, all screens repeated for lunch and dinner except for #1 with slight menu variations*

APPENDIX H

STUDY 2 ALTERNATE REGRESSION RESULTS

	Dwell Time (ms)						Body Mass Index (BMI)						Calories Chosen					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.	b	Sig.
Gender	0.02	0.77	0.09	0.22	0.09	0.25	0.19**	0.02	0.25***	0.00	0.25***	0.00	0.17**	0.03	0.16**	0.05	0.16**	0.05
Restraint			0.35***	0.00	0.33***	0.00			0.33***	0.00	0.30***	0.00			-0.07	0.33	-0.07	0.45
EI			0.07	0.34	0.09	0.27			0.17**	0.02	0.27	0.11			0.02	0.80	0.01	0.89
Impulsivity			0.10	0.20	0.02	0.86			0.08	0.32	0.18**	0.02			-0.06	0.50	-0.08	0.49
Restraint*Impulsivity					0.12	0.44					0.14	0.35					-0.07	0.68
Restraint*EI					-0.02	0.86					0.02	0.82					0.03	0.73
Impulsivity*EI					-0.12	0.28					-0.14	0.19					-0.02	0.89
R ²	0.00		0.15		0.15		0.04		0.18		0.19		0.03		0.04		0.04	
Adj R ²	-0.01		0.13		0.12		0.03		0.16		0.16		0.02		0.02		0.00	
F	0.09	0.77	6.99***	0.00	4.16***	0.00	6.10**	0.02	9.18***	0.00	5.46	0.00	5.02**	0.03	1.72	0.15	1.03	0.41
Δ F	0.09	0.77	9.29***	0.00	0.48	0.70	6.10**	0.02	9.88***	0.00	0.59	0.63	5.02**	0.03	0.63	0.60	0.15	0.93
Δ R ²	0.00		0.15		0.01		0.04		0.15		0.01		0.03		0.01		0.00	

*** p < .01

** p < .05

* p < .1

EI = Emotional Intelligence

APPENDIX I

MINDFULNESS INTERVENTION CLASS SCHEDULE

Session 1

Practices: Introduction to mindful eating, Raisin exercise, Body Scan

Homework: “Daily mindfulness” handout

Session 2

Practices: Mindfulness of breath and thoughts, 3 minute breathing space/ Mini-meditation, Hunger cues and triggers of binge eating, Mindful eating exercise (cheese and crackers), Check in with participants

Homework: Practice mini-meditation, Eat 1 snack per day mindfully

Session 3

Practices: General meditation, Taste and satiety meditation, Hershey Kisses exercise

Homework: Eat 1 snack per day mindfully

Session 4

Practices: Loving Kindness and Self-compassion meditation, Binge Recovery

Practices: In-class activities

Homework: Out of class activities

APPENDIX J

STUDY 3 QUESTIONNAIRE

Please provide your e-mail address for the purposes of granting you SONA credit.

Have you ever been diagnosed with an eating disorder?

Yes

No

If Yes Is Selected, Then Skip To End of Survey

Please answer the following questions to the best of your ability. All answers are anonymous, so you will never be identified based on any information disclosed in this questionnaire. This questionnaire is solely for the purpose of my dissertation research.

To what degree do you experience hunger at this moment? (*Ward and Mann, 2000*)

1= Not at all, 7= Extremely hungry

What is your mood level? (*Ward and Mann, 2000*)

1=extremely negative, 7= extremely positive

Skip meals

How many days during the last week (0-7) did you skip meals? (Bahl et al., 2012)

Overeat

How many days during the last week (0-7) did you overeat? (Bahl et al., 2012)

What is your age?

18

19

20

21

22+

What is your gender?

Male

Female

How often do you eat fast food?

Monthly

Every other week

Once a week

2-3 times per week

4-6 times per week

Daily

What is your ethnicity?

African-American

Caucasian

Asian-American

Hispanic

Other

What is your height? ____ Fill in the blank

What is your weight? ____ Fill in the blank

COMPUTE BMI

*The following questions refer to your normal eating pattern and weight fluctuations.
Please answer accordingly.*

The Restraint Scale

Note. Factor structure - CD= Concern for Dieting. WF = Weight Fluctuations.

Herman and Polivy (1980)

1. How often are you dieting? Factor CD (Scored 0-4)

Never

Rarely

Sometimes

Often

Always

2. What is the maximum amount of weight (in pounds) you have ever lost in one month?

WF Scored (0-4)

0-4

5-9

10-14

15-19

20+

3. What is your maximum weight gain within a week? WF Scored (0-4)

0-1
 1.1- 2
 2.1- 3
 3.1- 5
 5.1 +

4. In a typical week, how much does your weight fluctuate? WF Scored (0-4)

0-1
 1.1- 2
 2.1- 3
 3.1- 5
 5.1 +

5. Would a weight fluctuation of 5 lbs affect the way you live your life? CD Scored (0-3)

Not at all
 Slightly
 Moderately
 Very Much

6. Do you eat sensibly in front of others and splurge alone? CD Scored (0-3)

Never
 Rarely
 Often
 Always

7. Do you give too much time and thought to food? CD Scored (0-3)

Never
 Rarely
 Often
 Always

8. Do you have feelings of guilt after overeating? CD Scored (0-3)

Never
 Rarely
 Often
 Always

9. How conscious are you of what you're eating? CD Scored (0-3)

Not at all
 Slightly
 Moderately
 Extremely

10. How many pounds over your desired weight were you at your maximum weight?

WF
 Scored (0-4)

0-1
1-5
6-10
11-20
21+

Three Factor Eating Questionnaire (TFEQ)/ Eating Inventory

Stunkard and Messick (1985)

Uncontrolled 1. When I smell a sizzling steak or juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.

Definitely true
Mostly true
Mostly false
Definitely false

Cog 2. I deliberately take small helpings as a means of controlling my weight.

Definitely true
Mostly true
Mostly false
Definitely false

Emotional eating 3. When I feel anxious, I find myself eating.

Definitely true
Mostly true
Mostly false
Definitely false

Uncontrolled 4. Sometimes when I start eating, I just can't seem to stop.

Definitely true
Mostly true
Mostly false
Definitely false

Uncontrolled 5. Being with someone who is eating often makes me hungry enough to eat also.

Definitely true
Mostly true
Mostly false
Definitely false

Emotional eating 6. When I feel blue, I often overeat.

Definitely true
Mostly true
Mostly false
Definitely false

Uncontrolled 7. When I see a real delicacy, I often get so hungry that I have to eat right away.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 8. I get so hungry that my stomach often seems like a bottomless pit.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.

Definitely true

Mostly true

Mostly false

Definitely false

Emotional eating 10. When I feel lonely, I console myself by eating.

Definitely true

Mostly true

Mostly false

Definitely false

Cog 11. I consciously hold back at meals in order not to weight gain.

Definitely true

Mostly true

Mostly false

Definitely false

Cog 12. I do not eat some foods because they make me fat.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 13. I am always hungry enough to eat at any time.

Definitely true

Mostly true

Mostly false

Definitely false

Uncontrolled 14. How often do you feel hungry?

Only at meal times
 Sometimes between meals
 Often between meals
 Almost always

Cog 15. How frequently do you avoid “stocking up” on tempting foods?
 Almost never
 Seldom
 Usually
 Almost always

Cog 16. How likely are you to consciously eat less than you want?
 Unlikely
 Slightly likely
 Moderately likely
 Very likely

Uncontrolled 17. Do you go on eating binges though you are not hungry?
 Never
 Rarely
 Sometimes
 At least once a week

Cog 18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself?
*The 1–2 scores were coded 1; 3–4 scores were coded 2;
 5–6 scores were coded 3; 7–8 scores were coded 4.*

Dutch Eating Behavior Questionnaire (DEBQ)

Van Strien, Frijters, Van Staveran, Defares, and Deurenberg (1986)

A score for this scale is obtained by dividing the sum of item scores by the total number of items; thus, a high score indicates a high degree of restrained eating.
 5 response categories, never, seldom, sometimes, often, and very often
 #1 and #6 have a ‘not relevant’ option included

11 When you have put on weight do you eat less than you usually do?
 Never
 Seldom
 Sometimes
 Often
 Very Often

12 Do you try to eat less at mealtimes than you would like to eat?

- 13 How often do you refuse food or drink offered because you are concerned about your weight?
- 14 Do you watch exactly what you eat?
- 15 Do you deliberately eat foods that are slimming?
- 16 When you have eaten too much, do you eat less than usual the following day?
- 17 Do you deliberately eat less in order not to become heavier?
- 18 How often do you try not to eat between meals because you are watching your weight?
- 19 How often in the evenings do you try not to eat because you are watching your weight?
- 20 Do you take your weight into account with what you eat?

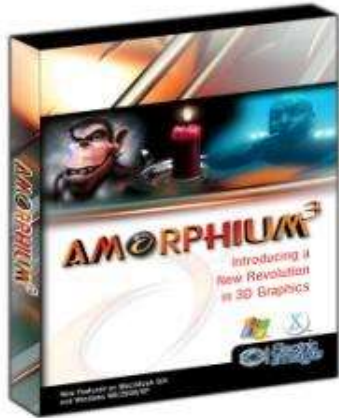
Barrett Impulsivity Scale Version 11 (BIS- 11)

Patton, Stanford, and Barratt, 1995

I "squirm" at plays or lectures.
 I am restless at the theater or lectures.
 I don't "pay attention."
 I concentrate easily.
 I am a steady thinker.
 I act 'on impulse.'
 I act on the spur of the moment.
 I buy things on impulse.
 I make up my mind quickly.
 I do things without thinking.
 I spend or charge more than I earn.
 I am happy-go-lucky.
 I am a careful thinker.
 I plan tasks carefully.
 I am self-controlled.
 I plan trips well ahead of time.
 I plan for job security.
 I say things without thinking.
 I like to think about complex problems.
 I like puzzles.
 I save regularly.
 I am more interested in the present than the future.
 I get easily bored when solving thought problems.
 I change residences.
 I change jobs.
 I am future oriented.
 I can only think about one problem at a time.
 I often have extraneous thoughts when thinking.
 I have 'racing' thoughts.
 I change hobbies.

CONSUMER EMOTIONAL INTELLIGENCE QUESTIONNAIRE

Kidwell, Hardesty, and Childers 2008



Indicate the amount of sadness expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of excitement expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

Indicate the amount of relaxation expressed by the product in this picture.â€ •

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of guilt expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present



Indicate the amount of surprise expressed by the product in this picture.

- a) Not at all present
- b) Slightly present
- c) Moderately present
- d) Quite present
- e) Extremely present

How useful might it be to feel certain emotions in the following situation?

	Very Useless	Useless	Neutral	Useful	Very Useful
How useful might it be to feel tension when interacting with an aggressive/pushy salesperson when making a purchase?					
How useful might it be to feel hostility when interacting with an aggressive/pushy salesperson at an auto dealership?					
How useful might it be to feel joy when consuming unhealthy food when maintaining a healthy diet?					
How useful might it be to feel frustration when purchasing something expensive and interacting with an incompetent salesperson?					

Joe felt anxious and became stressed when he thought about having to negotiate a price with a car dealer when buying a new car. When the dealer became pushy and began aggressively negotiating the price, Joe then felt ____.

- a) Self-conscious
- b) Depressed
- c) Ashamed
- d) Overwhelmed
- e) Happy

John was in a hurry to eat lunch before an afternoon meeting. When John stopped at a fast food restaurant, he was happy to see that there were healthy food choices on the menu. After reading the nutritional information he was even more pleased about the choice he made, he felt ____.

- a) Depressed
- b) Content
- c) Unsure
- d) Fatigued
- e) Active

A young woman went into a grocery store happy and left the store feeling sad. What happened in between?

- a) she noticed an elderly lady passing out free samples of food
- b) she went to buy her favorite product and it wasn't there
- c) she was buying products that made her feel uncomfortable talking to the cashier
- d) she realized she had a lot of things to do in the afternoon
- e) she was treated rudely by the cashier

A young man was returning expensive clothes. He felt embarrassed and then he felt angry. What happened in between?

- a) he realized that he should not have bought the clothes in the first place
- b) he saw an old friend in the store who was in a hurry and couldn't talk
- c) he decided that he couldn't afford the clothes after all
- d) he was encountered by a salesperson who was suspicious of his intentions
- e) he realized that he lost one of the items he wanted to return

A man watched a TV commercial. He felt sad and then he felt guilty. What happened in between?

- a) the commercial was offensive and made him not want to watch anymore
- b) the commercial was inspiring and made him think about an old relationship
- c) the commercial was thoughtful and made him think about losing touch with an old friend
- d) the commercial was strange and made him think about his years growing up
- e) the commercial was interesting and made him think about a new career path

Debbie just came back from a day of clothes shopping. She was feeling peaceful and content. How well would the following behavior preserve Debbie's emotions? Behavior: She decides it is best to ignore the feeling since it wouldn't last.

- f) Very Ineffective
- g) Ineffective
- h) Neither Effective nor Ineffective
- i) Effective
- j) Very Effective

John went to his favorite clothing store where he saw a shirt that he wanted to buy last week. He felt stressed and frustrated because the shirt that he wanted was no longer

there. How well would the following behavior help John reduce his frustration? Behavior: He should discontinue future shopping at that store.

- f) Very Ineffective
- g) Ineffective
- h) Neither Effective nor Ineffective
- i) Effective
- j) Very Effective

Becky and Steve want to buy a new car. They will share the car and both have specific preferences in the type of car to be purchased. They have a good relationship but are stubborn about the car that they each want. How effective would Becky be in maintaining a good relationship with Steve if she performed the following behavior? Behavior: She should be sarcastic so that Steve will back down and they buy the car she really wants.

- f) Very Ineffective
- g) Ineffective
- h) Neither Effective nor Ineffective
- i) Effective
- j) Very Effective

Sarah has a job in which she interacts with many of her clients. These clients are very important to her and her company since they represent large accounts. She has a great relationship with her clients, although today, one of her clients is very rude and made an offensive comment to her. How effective would Sarah be in maintaining a good relationship with this client if performing the following behavior? Behavior: She should become rude and offensive back to the client.

- f) Very Ineffective
- g) Ineffective
- h) Neither Effective nor Ineffective
- i) Effective
- j) Very Effective

APPENDIX K

MINDFULNESS TRAINING CLASS MATERIALS

The 3-Minute Breathing Space

STEP 1. BECOMING AWARE

Become more aware of how things are in this moment by deliberately adopting an erect and dignified posture, whether sitting or standing. If possible, close your eyes. Then, bringing your awareness to your inner experience and acknowledging it, ask, “What is my experience **right now**?”

- What **THOUGHTS** are going through the mind? As best you can, acknowledge thoughts as mental events, perhaps putting them into words.
- What **FEELINGS** are here? Turn toward any sense of discomfort or unpleasant feelings, acknowledging them.
- What **BODY SENSATIONS** are here right now? Perhaps quickly scan the body to pick up any sensations of tightness or bracing, acknowledging the sensations.

STEP 2. GATHERING

Then redirect your attention to focus on the physical sensations of the breathing itself. Move in close to the sense of the breath in the abdomen . . . feeling the sensations of the abdomen wall expanding as the breath comes in . . . and falling back as the breath goes out. Follow the breath all the way in and all the way out, using the breathing to anchor yourself into the present.

STEP 3. EXPANDING

Now expand the field of your awareness around the breathing so that it includes a sense of the body as a whole, your posture, and facial expression.

If you become aware of any sensations of discomfort, tension, or resistance, take your awareness there by breathing into them on the in-breath. Then breathe out from those sensations, softening and opening with the outbreath.

As best you can, bring this expanded awareness to the next moments of your day.

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Daily Mindfulness

- When you first wake up in the morning, before you get out of bed, bring your attention to your breathing. Observe five mindful breaths.
- Notice changes in your posture. Be aware of how your body and mind feel when you move from lying down to sitting, to standing, to walking. Notice each time you make a transition from one posture to the next.
- Whenever you hear a phone ring, a bird sing, a train pass by, laughter, a car horn, the wind, the sound of a door closing—use any sound as the bell of mindfulness. Really listen and be present and awake.
- Throughout the day, take a few moments to bring your attention to your breathing. Observe five mindful breaths.
- Whenever you eat or drink something, take a minute and breathe. Look at your food and realize that the food was connected to something that nourished its growth. Can you see the sunlight, the rain, the earth, the farmer, the trucker in your food? Pay attention as you eat, consciously consuming this food for your physical health. Bring awareness to seeing your food, smelling your food, tasting your food, chewing your food, and swallowing your food.
- Notice your body while you walk or stand. Take a moment to notice your posture. Pay attention to the contact of the ground under your feet. Feel the air on your face, arms, and legs as you walk. Are you rushing?
- Bring awareness to listening and talking. Can you listen without agreeing or disagreeing, liking or disliking, or planning what you will say when it is your turn? When talking, can you just say what you need to say without overstating or understating? Can you notice how your mind and body feel?
- Whenever you wait in a line, use this time to notice standing and breathing. Feel the contact of your feet on the floor and how your body feels. Bring attention to the rise and fall of your abdomen. Are you feeling impatient?
- Be aware of any points of tightness in your body throughout the day. See if you can breathe into them and, as you exhale, let go of excess tension. Is there tension stored anywhere in your body? For example, your neck, shoulders, stomach, jaw, or lower back? If possible, stretch or do yoga once a day.
- Focus attention on daily activities such as brushing your teeth, washing up, brushing your hair, putting on your shoes, or doing your job. Bring mindfulness to each activity.
- Before you go to sleep at night, take a few minutes and bring your attention to your breathing. Observe five mindful breaths.

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THE PRINCIPLES OF MINDFUL EATING

Principles of Mindfulness:

- Mindfulness is deliberately paying attention, non-judgmentally.
- Mindfulness encompasses both internal processes and external environments.
- Mindfulness is being aware of what is present for you mentally, emotionally and physically in each moment.
- With practice, mindfulness cultivates the possibility of freeing yourself of reactive, habitual patterns of thinking, feeling and acting.
- Mindfulness promotes balance, choice, wisdom and acceptance of what is.



Mindful Eating is:



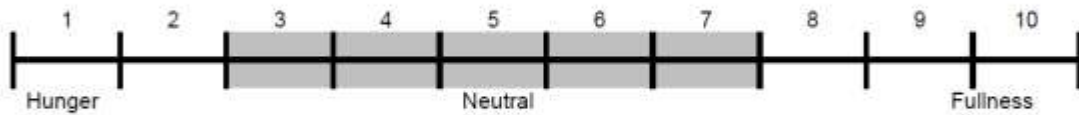
- Allowing yourself to become aware of the positive and nurturing opportunities that are available through food preparation and consumption by respecting your own inner wisdom.
- Choosing to eat food that is both pleasing to you and nourishing to your body by using all your senses to explore, savor and taste.
- Acknowledging responses to food (likes, neutral or dislikes) without judgment.
- Learning to be aware of physical hunger and satiety cues to guide your decision to begin eating and to stop eating.

Someone Who Eats Mindfully:

- Acknowledges that there is no right or wrong way to eat but varying degrees of awareness surrounding the experience of food.
- Accepts that his/her eating experiences are unique.
- Is an individual who by choice, directs his/her awareness to all aspects of food and eating on a moment-by-moment basis.
- Is an individual who looks at the immediate choices and direct experiences associated with food and eating; not to the distant health outcome of that choice.
- Is aware of and reflects on the effects caused by unmindful eating.
- Experiences insight about how he/she can act to achieve specific health goals as he/she becomes more attuned to the direct experience of eating and feelings of health.
- Becomes aware of the interconnection of earth, living beings, and cultural practices and the impact of his/her food choices has on those systems.



Hunger/Satiety Scale



- 1 = Extremely hungry, famished, lightheaded, headache, no energy
- 2 = Still overly hungry, stomach growling, irritable, weak, low energy
- 3 = Hungry, want to eat now, sensing hunger, stomach feels empty, thinking about food
- 4 = A little bit hungry, a snack would do, or making plans for eating soon, stomach starting to feel empty
- 5 = Neutral - Not hungry, not full
- 6 = A little but full, not quite satisfied, have not eaten enough
- 7 = Satisfied and comfortably full
- 8 = A little too full, starting to feel uncomfortably full
- 9 = Overly full, uncomfortable
- 10 = Extremely full, painful, very physically and emotionally distressing

Rate how your stomach feels before, during and after each meal or snack. Be sure to put a number to your hunger and fullness each time you eat to help you develop an understanding of eating based on your internal physical cues.

Hunger level of 3 is the ideal hunger level for eating a meal.
Fullness level of 7 is the target for ending a meal.

Developed by Lisa Burgoon MS, RD, LD, Sports Nutritionist, SportWell Center, University of Illinois at Urbana - Champaign, 1998.

Mindful Eating

Summary Tips

- Mindful eating is about opening the mind's awareness to our food and to the body, before, during, and after we eat.
- Mindful eating is nonjudgmental.
- Awareness is the key to change. Once we are aware of something, it cannot remain the same. Awareness plus small changes in our automatic behaviors can produce large changes over time.
- Learn to assess stomach and cellular hunger before, during eating, and after eating.
- If you are not hungry, don't eat.
- Be present for at least the first three bites or sips as you begin to eat or drink.
- Eat small portions, considering "right amount." Serve yourself an amount of food that will leave you two-thirds full.
- Eat slowly, savoring each bite. Find ways of pausing as you eat such as putting down your fork or spoon between bites.
- Chew your food thoroughly before swallowing.
- Become aware of the difference between "no longer hungry" and "full." There is no need to eat all the way to "full." Eat until you are two-thirds full, then take a drink and rest a bit.
- Mindful eating includes mindless eating. You can choose to eat mindlessly when it is appropriate.
- Emptying is as important as filling. This applies both to the stomach and to the mind.
- At least once a week, eat an entire meal in silence and mindfulness.
- Know that food changes mood and use it as good medicine. Adjust the dose; a small amount may work better than a lot.
- Above all, know when it is not the body but the heart that is asking to be fed. Give it the nutrition that fills it up. That nutrition could be meditation, walking, being in nature, listening to or making music, playing with a pet, fixing food for someone you love or who needs help, or just sitting and being present with people. Fill the heart with the richness of this very moment.
- Before, during, and after eating, give thanks.

Source: *Mindful Eating*, by Jan Chozen Bays

The Seven Kinds of Hunger

Eye Hunger

- When you first sit down to eat, take a few moments to look at the food. Notice colors, textures, shapes, and arrangements on the plate. What do the eyes like about the food?
- *Beauty* satisfies eye hunger. Try making a mindful meal once a week for yourself as if you were a guest. Get out your best plates, decorate the table, and arrange food appealingly. As you eat, let your eyes “feed” on not only the food, but the other aspects of your table.
- Experiment with feeding eye hunger by itself, without eating any food. Find something that is lovely or at least interesting to look at. Stop and really look at this something for a few minutes, drinking it in with your eyes. Feed your eyes as long as you like. You may find that feeding the eyes also feeds the heart.

Nose Hunger

- Nose hunger is satisfied by *fragrance*. Before you eat a meal, smell the food. Imagine that you have been asked to guess the ingredients or write a description of the aroma.
- As you eat, continue to be aware of smell. As you chew, notice if the taste is stronger on the in-breath or the out-breath, or does it change?
- After you’ve finished eating, sit for a few moments and notice how long you continue to taste the food. In you decided not to take another bite until you could no longer taste the food you had just swallowed, how long might that take?

Mouth Hunger

- During the day, notice mouth hunger. How does the mouth signal you, “Please put something in here?” What are the sensations of mouth hunger? See if you can ask the mouth what it wants and why. Does it want salty, sweet, sour, crunchy, or creamy?
- Before you eat, with the food in front of you, pause. Look at the food and become aware of the mouth’s desire for food. During the meal, pause every five minutes to assess mouth hunger. Does it change?
- When the mouth seems hungry, look inward to see if the mouth is thirsty instead of hungry. Take a drink and see if the amount of mouth hunger changes.
- Mouth hunger is satisfied by *sensation*. Explore the role of texture and chewing in feeding mouth hunger. Which texture satisfies more? What do you find if you chew a little or a lot?

Stomach Hunger

- Be aware of the sensations in the stomach during the day. How does the stomach signal to you that it is hungry?
- When you’re eating, what sensations tell you that the stomach is empty? Pleasantly full? Overfull?
- Are there other situations besides hunger that make the stomach feel pangs or discomfort? What do you think is going on at those times?
- When does the stomach signal hunger? Is it at predictable times? When during the day does it signal most strongly: before breakfast, at noon, afternoon, before dinner, bedtime?

- When you sit down to eat, take a few seconds to assess stomach hunger. After you've eating half of your food, stop eating and assess stomach hunger again. Assess stomach hunger at the end of the meal.
- To satisfy stomach hunger, we need to feed the stomach just enough food, let it do its work, and then let it rest, pausing periodically to check in with the stomach to discern when it is becoming comfortably full.

Cellular Hunger

- Sit quickly, close your eyes, and become aware of the entire body. Can you discern whether the cells of the body are hungry or satisfied? Ask your body what it needs.
- Halfway through a meal, stop eating, close your eyes, and try to feel if the body itself is hungry now. If so, for what? At the end of the meal, stop, close your eyes, and ask again.
- Sometimes what we interpret as hunger is actually cellular thirst. Before you eat a snack, try having something to drink instead. Sip it slowly, with awareness of temperature and taste. Now investigate whether your hunger has changed.
- The *essential elements* satisfy cellular hunger. These include water, salt, protein, fat, carbohydrates, minerals, vitamins, and other nutrients such as iron or zinc.

Mind Hunger

- During the day become aware of what the mind is telling you about food and drink. Listen for the mind's commands on what you "should" and "should not" eat or drink. Notice whether there are competing voices that say different things about the same food.
- Before you eat, pause and look at the food. Listen to hear what the mind is saying about this food and drink before you.
- What is the mind saying about hunger? Is hunger "good" or "bad"? Check the eyes, stomach, body, and mind to see where hunger might lie.
- What is the mind saying about satisfaction? Check before, during, and after the meal. Move the mind's awareness to the mouth, stomach, and body. What parts are satisfied, unsatisfied?
- Mind hunger is difficult to satisfy because the mind is always changing its mind. The mind is truly content only when it becomes *quiet*.

Heart Hunger

- What foods do you eat when you are sad or lonely? Make a list.
- When, between meals, you feel the impulse to have a snack or a drink, look at what you are feeling just before that impulse arose. If you have the snack or drink, does anything change?
- When you become aware of heart hunger, pick a favorite comfort food. Buy a small portion or single helping. Eat it very slowly. As you swallow each bite, imagine sending it to your heart, infused with kindness and love.
- Heart hunger is satisfied by *intimacy*. When you feel hungry, but a check of the seven hungers reveals that the mouth, stomach, and body are not hungry, do something deliberate to nourish the heart. Talk to a person you love, play with a child or pet, create something, listen to your favorite music. If you eat, eat slowly, and open your awareness to the multitude of beings who brought this food to your table. Give thanks.

Who is hungry in there?

- Before eating or drinking, look inward and ask each of these parts if it is hungry. If the answer is yes, ask that part how hungry it is on a scale of zero (not interested at all) to ten (famished).

Source: *Mindful Eating*, by Jan Chozen Bays, MD

APPENDIX L

FOOD DIARY EXAMPLE

Example				
<u>Day 1</u>	Food/Drink	Brand name of food or drink if possible	Portion Size	Preparation Method
Breakfast	Bagel	Panera		Toasted
	w/ Cream cheese		side of cream cheese from Panera	
	Orange juice			
Lunch	Chef salad		1.5 cups salad	
	with ranch dressing		2 tablespoons dressing	
	Diet Soda	Diet Pepsi		
Snack	Apple (with skin)		medium sized	
	water			
Dinner	Chicken breast	Tyson	6 oz	grilled
	Potatoes		medium (6 oz)	baked
	Skim milk	AE	2 cups	